

PIERS

Progress In Electromagnetics Research Symposium

Program

July 12-16, 1993

**Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California, USA**

JUN 22 1993

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California Institute of Technology
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The Electromagnetics Academy
National Aeronautics and Space Administration
Jet-Propulsion Laboratory, California Institute of Technology

TECHNICAL PROGRAM

MONDAY AM

- 1A1** Inverse Problems of Low-Frequency Electromagnetics
- 1A2** Antennas and Radiation
- 1A3** Computational Electromagnetics I
- 1A4** Current Topics in Scattering and Diffraction
- 1A5** Field Effects of Moving Sources and Propagative Media
- 1A6** Linear and Nonlinear Optical Properties of Surfaces
- 1A7** Remote Sensing of the Earth
- 1A8** Near-Field Microwave Imaging: Theory and Practice
- 1A9** Remote Sensing of the Ocean

TUESDAY AM

- 2A1** Radar Polarimetry: Basic Theory
- 2A2** Synthesis of Antenna Aperture Distributions
- 2A3** Computational Electromagnetics III
- 2A4** Scattering and Diffraction I
- 2A5** Inhomogeneous Media
- 2A6** Bridges From Electromagnetic Theory to Circuit Theory: How To Describe Electromagnetic Phenomena
- 2A7** Remote Sensing II
- 2A8** Electromagnetic Inverse Scattering
- 2A9** Electromagnetic Subsurface Sensing I

WEDNESDAY AM

- 3A1** Radar Polarimetry: Metrology
- 3A2** Microstrip Antennas and Structures
- 3A3** Generalized Multipole Techniques
- 3A4** Surface and Volume Scattering: Rough Surface Scattering
- 3A5** Electromagnetic Interactions With Special Media II
- 3A6** Special Session Honoring Prof. Charles Papas
- 3A7** Devices and Circuits II
- 3A8** Microstrip and Coplanar Lines
- 3A9** Sea Ice Electromagnetics I

MONDAY PM

- 1P1** Radar Clutter and Multipath Effects
- 1P2** Antennas and Computations
- 1P3** Computational Electromagnetics II
- 1P4** Scattering and Diffraction of Electromagnetic Waves
- 1P5** Electromagnetic Interaction With the Atmosphere, Ionosphere, and Troposphere
- 1P6** Analytical Methods
- 1P7** Remote Sensing I
- 1P8** Electromagnetic Inverse Scattering Methods for Geophysical Applications
- 1P9** Microwave Remote Sensing of Ocean Wind

TUESDAY PM

- 2P1** Radar Polarimetry: Vector Scattering
- 2P2** Microstrip and Printed Antennas
- 2P3** Recent Advances in the Computation and Diffraction of Electromagnetic Waves
- 2P4** Scattering and Diffraction II
- 2P5** Electromagnetic Interactions With Special Media I
- 2P6** New Trends in Electromagnetic Theory
- 2P7** Devices and Circuits I
- 2P8** Wave Propagation and Planar Structures
- 2P9** Electromagnetic Subsurface Sensing II

WEDNESDAY PM

- 3P1** Radar Polarimetry: Imaging
 - 3P2** Electromagnetic Interference and Antennas
 - 3P3** Efficient Methods to Solve Wave-Scattering and Propagation Problems
 - 3P4** Dense Media and Rough Surface Scattering
 - 3P5** Bianisotropic and Chiral Media
 - 3P6** Medical Applications
 - 3P7** Microwave/Millimeter Wave Instrumentation and Calibration
 - 3P8** Full-Wave Simulation of Waveguide Discontinuities
 - 3P9** Sea Ice Electromagnetics II
-

THURSDAY AM

- 4A1 Radar Polarimetry: Signal Processing Applications
- 4A2 Antenna Arrays
- 4A3 Advanced Computational Methods and Massive Parallel Computation
- 4A4 Rough Surface Scattering
- 4A5 Electromagnetic Propagation in Composite Materials: Electromagnetic Modeling
- 4A6 Medical and Biological Applications of Microwaves
- 4A7 Electromagnetic Compatibility in Equipment and Integrated Circuit Packaging Technology
- 4A8 Transmission Lines
- 4A9 Microwave Radiometry for Remote Sensing

FRIDAY AM

- 5A1 Radar Polarimetry: Meteorological Applications
- 5A2 Special Antennas and Applications
- 5A3 Transient Radar
- 5A4 Volume Scattering
- 5A5 Passive Components I
- 5A6 Electromagnetics in Biology and Medicine
- 5A7 Quasi-Optical Electronics
- 5A8 Interferometry I
- 5A9 Radar Remote Sensing of Forests

THURSDAY PM

- 4P1 Radar Polarimetry: System Application and Radar Meteorology
- 4P2 Array Applications
- 4P3 Physical Mechanism Extraction From Computational Methods
- 4P4 Diffraction
- 4P5 Electromagnetic Propagation in Composite Materials: Measurement Techniques
- 4P6 Biomedical Applications of Computational Electromagnetics
- 4P7 Microwave Applications of Ferroelectric Thin Films
- 4P8 Waveguides and Waveguide Components
- 4P9 Passive Microwave Remote Sensing for Spaceborne Applications

FRIDAY PM

- 5P1 Radar Polarimetry: Gigahertz Wave Scattering
 - 5P2 Mobile Antennas and Intelligent Antennas for Earth Observations
 - 5P3 Computational Electromagnetic Methods for Electrically Large Problems
 - 5P5 Passive Components II
 - 5P7 Experimental and Theoretical Advances in Photonic Band Structure*
 - 5P8 Interferometry II
 - 5P9 Radar Systems and Applications
-

SYMPOSIUM SITE AND OFFICE LOCATION

All PIERS technical functions will be held July 12-16, 1993, at California Institute of Technology (Caltech), Pasadena, California, USA.

Prior to July 12, 1993, the PIERS Office will be at Jet Propulsion Laboratory, Pasadena, CA, USA, Tel: (818) 354-9311. During the five-day Symposium, the PIERS Office will be in Caltech's Baxter 128, from 8 am to 5 pm.

REGISTRATION

Advance Registration

All participants are encouraged to preregister for PIERS. The registration fee will be US\$230 if received by June 15, 1993. The registration fee after this date will be US\$285. To preregister, please complete the enclosed PIERS registration form, with your check, money order, or bank draft in US currency, made payable to PIERS, and send to:

Georgene Peralta
Jet Propulsion Laboratory
4800 Oak Grove Drive, 180-404
Pasadena, California, 91101-8099, USA
(818) 354-9311
FAX : (818) 393-4468

Mail early to assure receipt by June 15, 1993. Remittance not in US currency will be returned.

On-Site Registration

PIERS begins on Monday, July 12, 1993 at Caltech. You may register at the Pasadena Hilton Hotel, on Sunday evening, July 11, between 6 pm and 9:30 pm. During the Symposium, you may register at Caltech's Dabney Lounge. Your badge and Symposium program will be waiting for you if you have preregistered.

Registration Fees

The registration fee for all participants, including session chairpersons and authors, is US\$230 if payment is received by June 15, 1993. After June 15, and during the Symposium, the registration fee will be increased to US\$285. The fee includes the reception, admittance to all sessions, refreshments, and Symposium programs and proceedings.

PROJECTION FACILITIES

Projection equipment available in each meeting room will be standard 35-mm slide (carousel type) and overhead projectors.

SPECIAL EVENTS

On Sunday evening, July 11, from 6 to 9:30 pm, join your PIERS hosts and other participants for an informal reception with a buffet and a no-host bar in the California Room at the Pasadena Hilton Hotel.

On Wednesday evening, July 14, from 7 to 10 pm, a party will be held in Caltech's Dabney Gardens for PIERS participants and their guests. Tickets are sold at US\$20 per person. Advance reservations are strongly recommended.

Tours to JPL will be offered during the symposium (sign up when you register).

ACCOMMODATIONS

Hotel Accommodations

Blocks of rooms have been set aside at the following hotels in Pasadena at special symposium rates, plus a 10.94% tax. (Note: The government-allowable rate in Pasadena is \$100.). Please make your reservations directly with the hotel. Mention your PIERS participation to obtain the special rate.

Pasadena Holiday Inn (818) 449-4000 FAX: (818) 584-1390	303 E. Cordova St. Pasadena, CA 91101 \$75 single or double
Pasadena Hilton Hotel (818) 577-1000 FAX: (818) 584-3148	150 S. Los Robles Ave. Pasadena, CA 91101 \$80 single or double
Doubletree Hotel (818) 792-2727 FAX: (818) 795-7669	171 N. Los Robles Ave. Pasadena, CA 91101 \$86 single or double
Ritz Carlton Huntington Hotel (818) 568-3900 FAX: (818) 568-3700	1401 S. Oak Knoll Drive Pasadena, CA 91104 \$90 single or double

June 21, 1993 is the cutoff date for the special rates. After this date, the hotels will honor the rate on a space-available basis only. There are also a number of motels in Pasadena. A partial list follows, along with maps of the Greater Los Angeles and Pasadena areas that show the location of Caltech and the four hotels.

Suggested Motels in the Pasadena Area

Pasadena Inn (818) 795-8401 FAX: (818) 577-2629 (Older, 3 blocks north of the end of the Pasadena 110 Freeway)	400 S. Arroyo Parkway Pasadena, CA 91105 \$43 single, \$48 double
Westway Inn (AAA) (818) 304-9678 FAX: (818) 449-3493	1599 E. Colorado Blvd. Pasadena, CA 91106 \$45 single, \$49 double
Saga Motor Lodge (818) 795-0431 FAX: (818) 792-0559	1633 E. Colorado Blvd. Pasadena, CA 91106 \$49 single or double
Best Western Colorado Inn (818) 793-9339 FAX: (818) 568-2731	2156 E. Colorado Blvd. Pasadena, CA 91107 \$40 single, \$44 double
Comfort Inn-East (818) 405-0811 FAX: (818) 796-0966 (All rooms have refrigerators, microwave ovens, remote control TVs with VCRs)	2462 E. Colorado Blvd. Pasadena, CA 91107 \$45 single, \$50 double, \$52 double double
Vagabond Inn (818) 449-3020 FAX: (818) 578-9791	2863 E. Colorado Blvd. Pasadena, CA 91107 \$35 single, \$39 double

Rodeway Inn
(818) 796-9291
FAX: 818-796-9780

3321 E. Colorado Blvd.
Pasadena, CA 91107
\$40 single, \$44 double

Best Western Pasadena Inn (AAA)
(818) 796-9100
FAX: (818) 405-9948

3570 E. Colorado Blvd.
Pasadena, CA 91107
\$38 single or double

Best Western Pasadena Royale (AAA)
(818) 793-0950
FAX: (818) 568-2827
(Rates vary depending on room size, standard
or suite; all rooms have refrigerators)

3600 E. Colorado Blvd.
Pasadena, CA 91107
\$42-\$52 single or double

Note: Rates listed are special JPL rates. Add 10.94% Pasadena tax. Be sure to mention JPL when making reservations to obtain the reduced rate. Rates are as of March 1992 and are subject to change without notice.

JPL does not recommend or endorse any one motel over the others.

TRANSPORTATION

The Los Angeles Area is served by four major airports: Los Angeles International Airport (LAX), Hollywood/Burbank, Ontario, and Orange County. The Airport Coach Company provides bus service from LAX to the Pasadena Hilton Hotel, Doubletree Hotel, and the Holiday Inn approximately once each hour: Take the airport bus marked "LAX-Pasadena." Tickets may be purchased outside each terminal or from the drivers. Boarding for each is just outside the baggage claim area for all airlines. Taxis, commercial shuttle service, and rental cars are readily available at the airports and in Pasadena. The Ritz Carlton operates a shuttle van to the Pasadena Hilton as a link to the airport bus service. For further information, call:

Airport Coach
(714) 491-3500
(500) 772-5299 (to LAX and other airports)

Super Shuttle
(310) 417-8988 (From LAX)
(310) 338-1111 (to LAX and other airports)

GENERAL INFORMATION

Currency Exchange

Foreign currencies may be exchanged for U.S. dollars at LAX or the following Pasadena locations:

Bank of America
530 E. Colorado Blvd.
(818) 577-5021

First Interstate Bank
380 Cordova Ave.
(818) 304-2588

Pasadena Hilton Hotel
150 S. Los Robles Ave.
(818) 577-1000
(Registered guests only)

Messages

During the symposium, you may receive telephone messages at (818) 356-6911. Messages will be posted on a bulletin board in Dabney Lounge. Please note that it will not be possible to page attendees.

Weather

The average temperature during July in Pasadena ranges from a high of 87°F (30°C) to a low of 59°F (15°C). The mornings are generally cool, the afternoons warm, and the evenings are mild.

Guest Activities

Located just 10 miles from downtown Los Angeles, at the foot of the San Gabriel Mountains, Pasadena is a distinctive Southern California city with a gracious style all its own. With a population of 132,000, Pasadena has an intimate small-town ambiance, with all the amenities of a sophisticated metropolitan center. Guests of the symposium attendees can plan their own agenda in Southern California and the Pasadena area. A representative of the Pasadena Convention and Visitors Bureau will be available during the registration period to answer questions and provide information about Southern California's many enjoyable sites and activities.

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PIERS TECHNICAL PROGRAM, THE SESSIONS

SESSION 1A1

Monday, July 12, AM 0820–1140, Beckman Institute Auditorium

Organizer: D. Lesselier

INVERSE PROBLEMS OF LOW-FREQUENCY ELECTROMAGNETISM

Co-Chairpersons: D. Lesselier, CNRS-ESE, Gif-sur-Yvette, France, and
H. Ermert, Ruhr—University Bochum, Bochum, FRG

- 0820 *Inverse Transformation From a Diffusive to a Propagative Field: Analytical and Numerical Solutions*
D. Gibert and B. Tournerie, Laboratoire de Géophysique Interne, Géosciences Rennes, Université de Rennes, France
J. Virieux, Institut de Géodynamique, CNRS, Valbonne, France
- 0840 *Optimization of Power Devices: A Review*
S. R. H. Hoole, Harvey Mudd College, Claremont, CA, USA
- 0900 *A Broadband Holographic Imaging Algorithm for Eddy Current NDT*
H. P. Maier and H. Ermert, Ruhr—University Bochum, Bochum, FRG
L. von Bernus, Siemens AG, Power Generation Group, Erlangen, FRG
- 0920 *Eddy Current Imaging of Defects in a Conductive Half-Space: Diffraction Tomographic and Generalized Solutions in a Wavefield Framework*
R. de Oliveira-Bohbot, D. Lesselier, B. Duchêne, M. Nikolova, and
A. Mohammad-Djafari, CNRS-ESE, Gif-sur-Yvette, France
- 0940 *Considerations on the Determination of the Spatially Varying Conductivity and Permeability of Metals from Eddy-Current Data*
J. H. Rose, Center for NDE, Iowa State University, Ames, IA, USA
- 1000 **Coffee Break**
- 1020 *Application of Markov Models for Inverse Problems in Eddy Current Nondestructive Evaluation*
L. Udpa and W. Lord, Iowa State University, Ames, IA, USA
- 1040 *Parabolic Electromagnetic NDE Phenomena*
W. Lord, S. Ross, L. Udpa, and M. Lusk, Iowa State University, Ames, IA, USA
- 1100 *An Introduction to Low Frequency (ULF/ELF/VLF) Radio Polarimetry and Some Applications to the Interpretation of Natural and Cultural Emission Signatures*
J. Y. Dea and P. M. Hansen, NCCOSC, NRD, San Diego, CA, USA
W.-M. Boerner, University of Illinois at Chicago, Chicago, IL, USA
- 1120 *Low Frequency Inverse Scattering*
P.-L. Shen and S.-M. Lin, Northwestern Polytechnical University, Xian, Shaanxi, PRC
-

SESSION 1A2

Monday July 12, AM 0820-1140, Baxter Lecture Hall

ANTENNAS AND RADIATION

Co-Chairpersons: W. A. Imbriale, JPL, California Institute of Technology, Pasadena, CA, USA, and
J. J. Lee, Hughes Aircraft, Fullerton, CA, USA

- 0820 *Necessary and Sufficient Condition for the Existence of an Inflection Point and Its Application to Reflector Antenna Analysis*
M. H. Rahnavard, Shiraz University, Shiraz, Iran
- 0840 *Rapid Solution of Patch Resonators by a Combined Complex Image and Contour Integral Method*
A. A. Omar and Y. L. Chow, University of Waterloo, Waterloo, Ontario, Canada
- 0900 *Method of Linearization for the Problem of Radiation Systems Synthesis*
V. I. Dmitriev, Moscow State University, Moscow, Russia
- 0920 *Probe Compensation in Cylindrical Near-Field Scanning: A Novel Simulation Methodology*
Z. A. Hussein and Y. Rahmat-Samii, JPL, California Institute of Technology, Pasadena, CA, USA
- 0940 *Biquadratic Programming and Antenna Design*
K. Hirasawa, University of Tsukuba, Tsukuba, Japan
- 1000 **Coffee Break**
- 1020 *EM Radiation From a Series of Sharp X-Ray Pulses*
R. L. Gardner, Phillips Laboratory, Kirtland AFB, NM, USA
- 1040 *Formulation of Time-Domain Planar Near-Field Measurements*
T. B. Hansen and A. D. Yaghjian, Rome Laboratory, Hanscom AFB, MA, USA
- 1100 *Line Source Radiation in the Presence of Structures Formed by a Finite Number of Slotted Cylinders*
V. Veremey, Institute of Radiophysics and Electronics, Ukrainian Academy of Sciences, Kharkov, Ukraine
- 1120 *FDTD Analysis of a Biparabolic Phased Array of Rectangular Apertures*
J. Ren and O. P. Gandhi, University of Utah, Salt Lake City, Utah, USA
L. R. Walker, J. Franschilla, and C. R. Boerman, Hughes Aircraft Company, Radar Systems Group, Los Angeles, CA, USA
-

SESSION 1A3

Monday, July 12, AM 0820-1140, Steele Laboratory, Room 102

COMPUTATIONAL ELECTROMAGNETICS I

Co-Chairpersons: A. Taflove, Northwestern University, Evanston, IL, USA, and
S. D. Gedney, University of Kentucky, Lexington, KY, USA

- 0820 *(FD²)TD Analysis of Electromagnetic Sensors for TDR Spectroscopy*
G. B. Gentili and M. Leoncini, University of Florence, Florence, Italy
- 0840 *Electromagnetic Radiation From Modules-on-Backplane Configurations in Computer Systems*
K. Li, M. A. Tassoudji, S. Y. Poh, R. T. Shin, and J. A. Kong, MIT, Cambridge, MA, USA
- 0900 *Analysis of Shielding Characteristics Based on the FDTD-Method Applied to Triaxial Structures*
S. Criel and D. De Zutter, University of Ghent, Ghent, Belgium
- 0920 *FD-TD Modeling of Digital Signal Propagation in 3-D Microstrip Circuits With Passive and Active Loads*
M. Piket-May, J. Baron, and A. Taflove, Northwestern University, Evanston, IL, USA
- 0940 *Analysis of Microstrip Dipoles and Slots Transversely Coupled to a Microstrip Line Using the FDTD Method*
A. N. Tulintseff, JPL, California Institute of Technology, Pasadena, CA, USA
- 1000 **Coffee Break**
- 1020 *Time-Domain Wave Propagation in Optical Structures*
R. Y. Chan and J. M. Liu, University of California, Los Angeles, CA, USA
- 1040 *Analysis of a Dielectric Measurement Probe Using the Frequency-Dependent Finite-Difference Time-Domain Technique*
M. S. Leong, P. S. Kooi, T. S. Yeo, and P. J. Hum, National University of Singapore, Singapore
- 1100 *FD-TD Modeling of 2-D Dielectric Waveguides for Propagation and Scattering of Femtosecond Optical Solitons*
R. Joseph and A. Taflove, Northwestern University, Evanston, IL, USA
P. Goorjian, NASA-AMES Research Center, Moffett Field, CA, USA
- 1120 *Analyses of Single and Coupled Dielectric Rib Waveguides and Discontinuities Using the Finite-Difference Time-Domain Method*
A. Mou, Y. E. Yang, and J. A. Kong, MIT, Cambridge, MA, USA
-

SESSION 1A4

Monday, July 12, AM 0840-1100, Downs Laboratory, Room 107

Organizers: A. K. Bhattacharya and Y. Rahmat-Samii

CURRENT TOPICS IN SCATTERING AND DIFFRACTION

Co-Chairpersons: A. K. Bhattacharya, New Mexico State University, Las Cruces, NM, USA, and
Y. Rahmat-Samii, University of California, Los Angeles, CA, USA

- 0840 *An Incremental Theory of Diffraction for Electromagnetic Waves*
R. Tiberio, S. Maci, and A. Toccafondi, University of Florence, Florence, Italy
- 0900 *The Physical Theory of Slope Diffraction*
P. Ya. Ufimtsev and Y. Rahmat-Samii, University of California, Los Angeles, CA, USA
K. M. Mitzner, Northrop Corporation, Pico Rivera, CA, USA
- 0920 *On the Application of Higher-Order Impedance Boundary Conditions to Coated Bodies of Revolution*
D. J. Hoppe and Y. Rahmat-Samii, University of California, Los Angeles, CA, USA
- 0940 *Hybrid Finite Element-Integral Equation Methods for Conformal Antenna Characterizations*
I. L. Volakis, L. C. Kempel, and J. Gong, University of Michigan, Ann Arbor, MI, USA
- 1000 **Coffee Break**
- 1020 *Hybrid Analysis (MM-UTD) of EM Scattering From Complex Structures*
M. Hsu, P. H. Pathak, and C. W. Chuang, Ohio State University, Columbus, OH, USA
- 1040 *SCS Grating: A New Electromagnetic Scattering Technique*
T. Mathew, D. S. Stephen, and K. G. Nair, Cochin University of Science and Technology, Cochin, India
-

SESSION 1A5

Monday, July 12, AM 0840-1120, Downs Laboratory, Room 103

Organizer: A. M. Casimiro

FIELD EFFECTS OF MOVING SOURCES AND PROPAGATIVE MEDIA

Co-Chairpersons: A. M. Casimiro, Universidade da Madeira, Funchal, Portugal, and
M. de F. Oliveira Vales da Silva, Instituto Superior de Engenharia do Porto, Porto, Portugal

- 0840 *Direct Calculation of the Electromagnetic Field of a Rotating Charge Distribution*
M. H. Marçal, Universidade Técnica de Lisboa, Instituto Superior Técnico, Lisboa,
Portugal
- 0900 *The Small Translation of No Parallel Sources*
A. M. E. S. Casimiro and J. A. R. Azevedo, Universidade da Madeira, Funchal,
Portugal
- 0920 *The Field Produced by the Superposition of No Parallel Sources*
A. M. E. S. Casimiro and J. A. R. Azevedo, Universidade da Madeira, Funchal,
Portugal
- 0940 *Change of Mode Numbers in a Waveguide by Adiabatic Change of Boundary
Conditions*
J. Hagel, Universidade da Madeira, Funchal, Portugal
J. Wagner and B. Schnizer, Institute for Theoretical Physics Technical University,
Graz, Austria
- 1000 **Coffee Break**
- 1020 *Measurement of Anisotropy in Microwave Substrates*
C. Peixeiro and A. M. Barbosa, CAPS/DEEC, Instituto Superior Técnico, Lisboa,
Portugal
- 1040 *The Influence of the Temperature Produced by Solar Radiation in the Feed-Horn and
LNB in Microwave Antennas*
M. de F. Oliveira Vales da Silva, Instituto Superior de Engenharia do Porto, Porto,
Portugal
- 1100 *The Effect on the Radiation Pattern of Coating the Reflector in Microwave Antennas*
M. de F. Oliveira Vales da Silva, Instituto Superior de Engenharia do Porto, Porto,
Portugal
-

SESSION 1A6

Monday, July 12, AM 0820-1140, Downs Laboratory, Room 11

Organizer: R. Del Sole

LINEAR AND NONLINEAR OPTICAL PROPERTIES OF SURFACES

Co-Chairpersons: R. Del Sole, Università di Roma "Tor Vergata," Rome, Italy, and
E. Yablonovich, Bell Communication Research, Navesink Research Center, Red Bank, NJ, USA

- 0820 *Surface Induced Optical Anisotropy*
H. Wormeester, D. J. Wentink, P. L. de Boeij, and A. van Silfhout, Twente Technical
University, Enschede, The Netherlands
- 0840 *Optical Response of Adatoms on Semiconductor Surfaces*
C. C. Matthai, UWCC, Cardiff, Wales, UK
- 0900 *Collective Surface Excitations in Arrays of Polarizable Particles*
F. Claro, Universidad Católica de Chile, Santiago, Chile
- 0920 *Exciton Polaritons in a Grating of Quantum Well Wires*
A. D'Andrea, Istituto di Metodologie Avanzate Inorganiche, CNR, Roma, Italy
- 0940 *Linear and Non Linear Optical Properties of Surfaces and Spatially Non-Local Potentials*
E. Piparo and R. Girlanda, Istituto di Struttura della Materia, Università di Messina,
Messina, Italy
- 1000 **Coffee Break**
- 1020 *Linear and Non-linear Surface Optical Properties of Silver Crystals*
W. L. Mochán, IFUNAM-C, Cuernavaca Mor., México
- 1040 *Surface and Interface (Electronic) Structure Studied With Nonlinear Optics*
T. Rasing, University of Nijmegen, Research Institute for Materials, The Netherlands
- 1100 *Theory of Second Harmonic Generation at Semiconductor Surfaces*
R. Del Sole and M. Cini, Università di Roma "Tor Vergata," Rome, Italy
L. Reining, Université Paris-Sud, Orsay, France
- 1120 *Local Fields and Surface Second Harmonic Generation*
C. M. J. Wijers and P. de Boeij, Twente University, Enschede, The Netherlands

SESSION 1A7

Monday, July 12, AM 0820-1140, Lauritsen Laboratory, Room 269

REMOTE SENSING OF THE EARTH

Co-Chairpersons: E. Rignot, JPL, California Institute of Technology, Pasadena, CA, USA, and
H. S. Tan, Nanyang Technological University, Singapore

- 0820 *Combined Use of Imaging Radar and Spectrometer Data Over Agricultural Terrains*
M. Borgeaud and J. Noll, ESA/ESTEC, Noordwijk, The Netherlands
- 0840 *Classification of Agricultural Land Uses Over Bare Soils With an Airborne Microwave Scatterometer*
M. Benallegue and M. Normand, CEMAGREF, Antony, France
O. Taconet, D. Vidal-Madjar, and L. Rakotoarivony, CRPE, Velizy, France
- 0900 *A General Rough-Surface Inversion Algorithm: Theory and Application to SAR Data*
M. Moghaddam, JPL, California Institute of Technology, Pasadena, CA, USA
- 0920 *Intercomparisons of Columnar Water Vapor Retrievals Obtained With a Sun Photometer and a Microwave Radiometer*
B. Schmid, R. Peter, and C. Mätzler, Institute of Applied Physics, University of Bern, Bern, Switzerland
- 0940 *Electrothermal Weed Control From dc to Infrared*
C. Mätzler, Institute of Applied Physics, University of Bern, Switzerland
- 1000 **Coffee Break**
- 1020 *Interpretation of SAR Polarimetric Data Over Agricultural Areas*
S. Baronti, S. Paloscia, and P. Pampaloni, Istituto di Ricerca sulle Onde Elettromagnetiche -CNR, Firenze, Italy
G. Schiavone, F. Del Frate, and D. Solimini, Università Tor Vergata, Roma, Italy
- 1040 *On Mechanism of Radar Detecting Hydrocarbon Microseepage*
H. Ming and Z. Junrong, Changchun Institute of Geography, Chinese Academy of Sciences, Changchun, PRC
- 1100 *Multispectral MM-Wave Imaging Sensor for Diagnostics of the Anomalous Processes in the Ocean-Atmosphere System*
I. V. Cherny, Center for Program Studies, Russian Academy of Sciences, Moscow, Russia
- 1120 *Microwave Studies of the Initial Conditions of Typhoon "Warren" Generation*
I. V. Cherny, Center for Program Studies, Russian Academy of Sciences, Moscow, Russia
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SESSION 1A8

Monday, July 12, AM 0820-1200, Keck Laboratories, Room 42

Organizer: J.-Ch. Bolomey

NEAR-FIELD MICROWAVE IMAGING: THEORY AND PRACTICE

Co-Chairpersons: J.-Ch. Bolomey, CNRS/ESE, Gif-sur-Yvette, France, and
W. C. Chew, University of Illinois at Urbana-Champaign, Urbana, IL, USA

- 0820 *Cognitive Networks for Automated Target Recognition and Autonomous System Application*
N. H. Farhat and H. Babri, University of Pennsylvania, Philadelphia, PA, USA
- 0840 *Comparison Between Inverse Scattering and Neural Network Approaches: Application to Microwave Inspection of Wooden Materials*
J. F. Portala, Pôle Productique, CTBA, Pont-à-Mousson, France
J. Ch. Bolomey, SUPÉLEC, Plateau du Moulon, Gif-sur-Yvette, France
- 0900 *Synthetic-Aperture Microwave Imaging and Its Applications to Nondestructive Evaluation of Civil Structures*
M. S. D'Errico, B. L. Douglas, and H. Lee, University of California, Santa Barbara, CA, USA
- 0920 *Variable-Permittivity Linear Inverse Problem for the H_z -Polarized Case*
M. Moghaddam, JPL, California Institute of Technology, Pasadena, CA, USA
W. C. Chew, University of Illinois at Urbana-Champaign, Urbana, IL, USA
- 0940 *Microwave Image Understanding and Its Application to Various Imaging Schemes*
H.-J. Li, National Taiwan University, Taipei, Taiwan, ROC
- 1000 **Coffee Break**
- 1020 *Nonlinear Inverse Scattering Techniques and Their Use in Processing Microwave Experimental Data*
W. C. Chew, G. P. Otto, J. H. Lin, W. H. Weedon, and C. C. Lu, Electromagnetics Laboratory, University of Illinois at Urbana-Champaign, Urbana, IL, USA
Y. M. Wang, National University of Singapore, Singapore
M. Moghaddam, JPL, California Institute of Technology, Pasadena, CA, USA
- 1040 *Quantitative Microwave Imaging for the 2D Scalar and 3D Vectorial Cases: Reconstructions From Simulated and Experimental Data*
N. Joachimowicz, A. Franchois, A. Joisel, J. Ch. Bolomey, and Ch. Pichot, Laboratoire des Signaux et Systèmes (CNRS-SUPÉLEC), Plateau du Moulon, Gif-sur-Yvette, France
- 1100 *Some Guidelines for an Efficient Use of Microwave Imaging Techniques*
J. Ch. Bolomey, SUPÉLEC, Plateau du Moulon, Gif-sur-Yvette, France
- 1120 *Microwave Imaging of Strongly Scattering Structures Using Cepstral Filtering Techniques*
M. A. Fiddy and F. C. Lin, University of Massachusetts, Lowell, MA, USA
R. V. McGahan and J. Morris, RL/ERCT, Hanscom AFB, MA, USA
- 1140 *A Near-Field Diagnostic Technique for EMC Coupling Analysis*
F. Thérond and F. Lucas, SATIMO, Zone de Courtaboeuf, Les Ulis, France
J. Ch. Bolomey and N. Joachimowicz, SUPÉLEC, Plateau du Moulon, Gif-sur-Yvette, France
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SESSION 1A9

Monday, July 12 AM 0840-1140, Beckman Laboratories, Room 24

REMOTE SENSING OF THE OCEAN

Co-Chairpersons: J. F. Vesecky, University of Michigan, Ann Arbor, MI, USA, and
J. R. Apel, Johns Hopkins University, APL, Laurel, MD, USA

- 0840 *Diffraction From Sharply Peaked Waves—An Alternative Theoretical Model of Ocean Surface Scattering*
G. A. Jensen, STAR Laboratory, Stanford University, Stanford, CA, USA
J. F. Vesecky, University of Michigan, Ann Arbor, MI, USA
- 0900 *An Improved Formulation of the Ocean Surface Wave Vector Spectrum and Its Effects on Microwave Ocean Scatter Calculations*
J. R. Apel, Johns Hopkins University, APL, Laurel, MD, USA
- 0920 *Analysis and Processing of Frequency-Domain and Short-Pulse Time-Domain Scattering From Periodic and Quasi-Periodic Environments*
M. R. McClure, Missile Systems Laboratories, Raytheon Company, Tewksbury, MA, USA
L. Carin and L. B. Felsen, Polytechnic University, Brooklyn, NY, USA
- 1000 **Coffee Break**
- 1020 *Orbital Microwave Scatterometry: Analysis of Doppler and Correlation Measurement Methods for Ocean Current Fields*
S. V. Pereslegin and A. M. Koroljov, Academy of Sciences, P. P. Shirshov Institute of Oceanology, Moscow, Russia
- 1040 *New Methods for Inverse Problems of Ocean Color*
V. N. Pelevin and S. V. Semovski, P. P. Shirshov Oceanology Institute of Russian Academy of Sciences, Moscow, Russia
- 1100 *Surface Active Material Film Influence on Wind Waves Statistical Characteristics*
V. N. Nosov, S. J. Pashin, and P. V. Soldatov, Russian Academy of Sciences, Vernadsky Institute of Geochemistry and Analytical Chemistry, Moscow, Russia
- 1120 *Some Characteristics of the Microwave Propagation Path Over the Ocean Surface*
V. Ye. Morozov and I. M. Mytsenko, Institute of Radiophysics and Electronics of the Academy of Sciences of the Ukraine, Kharkov, Ukraine
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SESSION 1P1

Monday, July 12, PM 1320-1700, Beckman Institute Auditorium

Organizer: H. Raemer

RADAR CLUTTER AND MULTIPATH EFFECTS

Co-Chairpersons: L. B. Wetzel, Naval Research Laboratory, Washington, DC, USA, and
A. I. Logvin, Moscow Civil Aviation Engineering Institute: MIIGA, Moscow, Russian Federation

- 1320 *Simulation of Clutter Over Ocean Surface*
Z. Coskun and H. Raemer, Northeastern University, Boston, MA, USA
- 1340 *In Search of the Origins of Sea Scatter*
L. B. Wetzel, Naval Research Laboratory, Washington, DC, USA
- 1400 *Ultra-Wideband, Polarimetric Radar Studies of Breaking Waves*
M. A. Sletten and D. B. Trizna, Naval Research Laboratory, Washington, DC, USA
J. Wu, University of Delaware, Lewes, DE, USA
- 1420 *Experimental Measurement of Bistatic Clutter Amplitude Echoes as Seen by Linearly and Elliptically Polarized Receivers*
W. G. Stevens, D. Fallon, and K. V. N. Rao, Rome Laboratory, ERCE, Hanscom AFB, MA, USA
- 1440 *Comparison of Data on the Polarization Dependence of Scattered Signals With a Theory Using Non-Gaussian Surface Correlation*
D. T. Tamaskanis, ARCON Corp., Waltham, MA, USA
W. G. Stevens, Rome Laboratory, ERCE, Hanscom AFB, MA, USA
- 1500 **Coffee Break**
- 1520 *Bistatic Scattering From Finite Clutter Cells: Dependence on Surface Correlation Function*
L. M. Sharpe, Rome Laboratory, ERCE, Hanscom AFB, MA, USA
- 1540 *High-Resolution, Fully Polarimetric Measurements of Low Grazing Angle Sea Clutter at X-Band*
N. Allan, D. McLaughlin, and R. Raghavan, Northeastern University, Boston, MA, USA
D. Trizna, Naval Research Laboratory, Washington, DC, USA
- 1600 *Wave Propagation in Layered Media With an Irregular Interface*
S. Mudaliar, Rome Laboratory, Hanscom AFB, MA, USA
- 1620 *Measurements and Theoretical Modeling of Radar Sea Backscatter and Multipath in the Frequency Range From 60 to 400 MHz*
M. A. Pollock, R. J. Dinger, and T. E. Tice, Naval Command, Control and Ocean Surveillance Center, San Diego, CA, USA
R. H. Ott, General Research Corp., Albuquerque, NM, USA
- 1640 *Development of Stochastic Polarimetric Model Description of Distributed Clutter*
A. I. Logvin and A. I. Kozlov, Moscow Civil Aviation Engineering Institute: MIIGA, Moscow, Russian Federation
R. V. Ostrovityanov, SPIAP, Sankt-Petersburg, Russian Federation

SESSION 1P2

Monday, July 12, PM 1320-1640, Baxter Lecture Hall

ANTENNAS AND COMPUTATIONS

Co-Chairpersons: J. Litva, McMaster University, Hamilton, Ontario, Canada, and
A. N. Tulintseff, JPL, California Institute of Technology, Pasadena, CA, USA

- 1320 *A Solution of the T-Antenna Using the Induced EMF Method*
A. I. Bahnacy, S. H. Zainud-Deen, and K. H. Awadalla, Menoufia University, Menouf, Egypt
M. N. I. Fahmy, Cairo University, Cairo, Egypt
- 1340 *Synthesis of Circular Polarized Normal Mode Helical Antenna*
S. H. Zainud-Deen, H. A. Sharshar, and K. H. Awadalla, Menoufia University, Menouf, Egypt
- 1400 *Asymmetrical Coupled Transmission Line Modelling of Grounded Ferrite Slab and Electronic Beam Scanning by a Slot Antenna in a Ferrite Slab*
Ö. Aydin and A. Hizal, Middle East Technical University, Ankara, Turkey
- 1420 *The Radiation Pattern of a Small Monopole Antenna in an Anisotropic Plasma*
A. F. M. Anwar, K.-W. Liu, and M. M. Jahan, University of Connecticut, Storrs, CT, USA
M. A. Matin, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh
- 1440 *The Extension of Optimum Antenna Polarizations for Target Discrimination in Clutter to the Multistatic Radar Case*
J. Yang, Northwestern Polytechnical University, Xian, PRC
- 1500 **Coffee Break**
- 1520 *Beam Forming for Imaging FMCW Radar*
A. Z. Tirkel and C. F. Osborne, Monash University, Caulfield East, Melbourne, Victoria, Australia
- 1540 *Short-Term Average Antenna Directional Pattern in Turbulent Atmosphere*
Z. I. Feizulin and A. G. Vinogradov, Mints Radio Engineering Institute of Russian Academy of Sciences, Moscow, Russia
- 1600 *Numerical Analysis of Equiangular Spiral Antenna With Reflecting Plane*
L. Guizhen and M. Zhiji, Beijing Broadcasting Institute, Beijing, PRC
L. Tiejun, Beijing Institute of Environmental Features, Beijing, PRC
Z. Xiaolan, Harbin Financial Institute, Harbin, Heilong Jiang Province, PRC
- 1620 *Application of Numerical Approximation in Antenna Computations*
M. Zhiji, L. Guizhen, and G. Xiaomei, Beijing Broadcasting Institute, Beijing, PRC
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SESSION 1P3

Monday, July 12, PM 1320-1700, Steele Laboratory, Room 102

COMPUTATIONAL ELECTROMAGNETICS II

Co-Chairpersons: M. S. Leong, National University of Singapore, Singapore, and
M. A. Morgan, Naval Postgraduate School, Monterey, CA, USA

- 1320 *On Computational Electromagnetics*
J. O'Grady, Oak Park, IL, USA
- 1340 *Using Parallel Architectures for Electromagnetic Scattering Problems*
Y. Lu, R. F. Harrington, and G. Fox, Syracuse University, Syracuse, NY, USA
- 1400 *Absorbing Boundary Condition for Monochromatic Oblique Incidence*
L. Gürel, IBM Research Division, Yorktown Heights, NY, USA
T. Gürel, Northeastern University, Boston, MA, USA
- 1420 *A Time-Dependent Approach as an Iterative Method for the Numerical Solution of Wave Equations in Scattering Problems*
R. T. Ling, Northrop B-2 Division, Pico Rivera, CA, USA
- 1440 *Algorithmization of Diffraction Problems for Inhomogeneities in Stratified Medium on the Basis of Singular Integral Equations*
Z. Nazarchuk and O. Ovsiannikov, Karpenko Physico-Mechanical Institute of Ukrainian Academy of Sciences, Lviv, Ukraine
- 1500 **Coffee Break**
- 1520 *Three Dimensional Scattering Computation Using the Fast Multipole Method*
L. Hamilton, M. Stalzer, R. S. Turley, J. Visner, and S. Wandzura, Hughes Research Laboratories, Malibu, CA, USA
- 1540 *The Fast Multipole Method for Pedestrians*
R. Coifman and V. Rokhlin, Fast Mathematical Algorithms and Hardware Corp., Hamden, CT, USA, and Yale University, New Haven, CT, USA
S. Wandzura, Hughes Research Laboratories, Malibu, CA, USA
- 1600 *A General Calculation Technique for the Green's Functions in the Mixed Potential Integral Equation Formulation of Microstrip-Slot Circuits With Vias*
K. Blomme, J. Van Hess, N. Faché, University of Ghent, Laboratory of Electromagnetism and Acoustics, Ghent, Belgium
D. De Zutter, NFWO and University of Ghent, Laboratory of Electromagnetism and Acoustics, Ghent, Belgium
- 1620 *Modelling of Bifurcation Behaviour in Nonlinear Electromagnetic Coupling Problems*
I. R. Frost and S. R. Cloude, University of York, UK
- 1640 *Method of Sequential Redeterminations Used for FFT in Electrodynamical Problems*
A. E. Serebrjannikov, Research and Engineering Institute "MOLNIJA," Kharkov Polytechnical Institute, Kharkov, Ukraine
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SESSION 1P4

Monday, July 12, PM 1340-1640, Downs Laboratory, Room 107
Organizer: A. Elsherbeni

SCATTERING AND DIFFRACTION OF ELECTROMAGNETIC WAVES

Co-Chairpersons: A. Elsherbeni, University of Mississippi, University, MS, USA, and
C. A. Balanis, Arizona State University, Tempe, AZ, USA

- 1340 *Higher-Order UTD Diffractions From a Strip/Plate Coated With a Thin, Lossy Material*
L. A. Polka and C. A. Balanis, Arizona State University, Tempe, AZ, USA
- 1400 *EM Scattering From Periodic Gratings of Lossy Conductors*
H. A. Kalhar, State University of New York, New Paltz, NY, USA
- 1420 *Characterizing Radio Wave Interactions With Ionized Fluids Using a Weighted Residual, Time-Domain Method*
J. L. Young, University of Idaho, Moscow, ID, USA
F. P. Brueckner, Advanced Projects Research Inc., Moorpark, CA, USA
- 1440 *Time-Domain Response of a Flat Plate of Arbitrary Size Using Time-Domain High Frequency Techniques*
B. D. Kahlar and A. K. Bhattacharyya, New Mexico State University, Las Cruces, NM, USA
- 1500 **Coffee Break**
- 1520 *The Scattering Effects of ILS Localizer on the MLS Azimuth Phased Array Antenna*
M. Z. El-Gamal, Transport Canada Aviation, Ottawa, Ontario, Canada
- 1540 *Moment Method Formulation for the Radiation Patterns of Conical and Circular Corrugated Horns*
A. Bhattacharyya, Hughes Space and Communication, Los Angeles, CA, USA
- 1600 *Scattering by Dielectric Shell Loading a Semicircular Channel in a Ground Plane*
H. A. Ragheb, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia
- 1620 *Generalized Schelkunoff Equivalence*
R. M. Bevensee, National University of Singapore, Singapore
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SESSION 1P5

Monday, July 12, PM 1320-1700, Downs Laboratory, Room 103

ELECTROMAGNETIC INTERACTION WITH THE ATMOSPHERE, IONOSPHERE, AND TROPOSPHERE

Co-Chairpersons: V. I. Tatarskii, NOAA/ERL/WPL, Boulder, CO, USA, and
D. Le Vine, NASA/Goddard Space Flight Center, Greenbelt, MD, USA

- 1320 *Occultation Measurements: Spectral Inversion and Atmospheric Tomography*
H. Haario, University of Helsinki, Helsinki, Finland
J. Tamminen, E. Kyrölä, and E. Sihvola, Finnish Meteorological Institute, Helsinki, Finland
- 1340 *Simulation of Optical Propagation in a Turbulent Atmosphere Using the Split Step Method*
M. Z. M. Jenu and D. H. O. Bebbington, University of Essex, Colchester, Essex, UK
- 1400 *A Study of Structure Intensity Parameter C^2_n Using LOS Microwave Links and Radiosonde Over Southern India*
D. N. Rao, K. K. Reddy, and S. V. Rao, Sri Venkateswara University, Tirupati, India
- 1420 *Prediction of the Propagation of SHF Radio Waves in Troposphere*
V. F. Naumenko, Institute of Radiophysics and Electronics of the Academy of Sciences of the Ukraine, Kharkov, Ukraine
- 1440 *A Unified Theory of Ionospheric Propagation of Short Radio Waves With Special Emphasis on Long-Distance Propagation*
B.-W. Lu, Institute of Electronics, Academia Sinica, Beijing, PRC
- 1500 **Coffee Break**
- 1520 *The Propagation of Quasi-Monochromatic and Quasi-Unidirectional Microwave Packets Between the Ground and Space*
B.-W. Lu, Institute of Electronics, Academia Sinica, Beijing, PRC
- 1540 *Spacecraft Observation of Stellar Scintillations and Optical Turbulence in the Earth's Stratosphere*
A. S. Gurvich, Institute of Atmospheric Physics, Moscow, Russia
- 1600 *Numerical Research of One Inverse Problem for Ionosphere Parameters Reconstruction*
V. I. Dmitriev and T. Yu. Chameeva, Moscow State University, Moscow, Russia
- 1620 *Calibration and Tuning of Devices for Measurement of Target Radiolocation Characteristics*
V. A. Sarychev, Leninetz, Sankt-Petersburg, Russian Federation
- 1640 *"Abnormal" Phase Dispersion in Millimeter Wave Propagation Over the Division Surface*
Yu. M. Galaev and F. V. Kivva, Institute of Radiophysics and Electronics of the Academy of Sciences of the Ukraine, Kharkov, Ukraine

SESSION 1P6

Monday, July 12, PM 1340-1700, Downs Laboratory, Room 11

ANALYTICAL METHODS

Co-Chairpersons: C. F. Chen, Boston University, Boston, MA, USA, and
Y. Kim, JPL, California Institute of Technology, Pasadena, CA, USA

- 1340 *The Derivation of the Condensed Symmetric TLM Node From Maxwell's Equations*
M. Krumpholz, P. Russer, and H. Zscheile, Ferdinand-Braun-Institut Für
Höchstfrequenztechnik, Berlin, Germany
- 1400 *Cauer Aggregation Modelling for Irrational Transfer Function Systems*
C. F. Chen, Boston University, Boston, MA, USA
- 1420 *Two-Dimensional Image Theory for the Conducting Wedge*
M. E. Ermutlu, I. V. Lindell, and K. I. Nikoskinen, Helsinki University of Technology,
Espoo, Finland
- 1440 *Transient Behavior of Pulsed Microwaves*
G. C. Giakos, University of Tennessee, Memphis, TN, USA
- 1500 **Coffee Break**
- 1520 *The Experimental Determination of Electromagnetic Energy Density*
C. Jeffries, Clemson University, Clemson, SC, USA
- 1540 *Holder Uniform Continuity to the Analysis of Problems With Edges*
A. Yakovlev and A. Gnilenko, Dniepropetrovsk State University, Dniepropetrovsk,
Ukraine
- 1600 *Modeling of Kirchhoff Diffraction by the Far Field Complex Ray Expansion*
Y. Dezhong and R. Yingzheng, University of Electronic Science and Technology of
China, Chengdu, PRC
- 1620 *Newton-Kantorovich Method in Non-Linear Magnetic Resonance Problems*
A. A. Vertyy and S. P. Gavrilov, Institute of Radiophysics and Electronics, Academy of
Sciences of the Ukraine, Kharkov, Ukraine
- 1640 *Field Transformation as a Result of Abrupt and Continuous Conductivity Change*
A. Nerukh, Kharkov Institute of Radioelectronics, Kharkov, Ukraine
I. Shavorykina, Kharkov State University, Kharkov, Ukraine
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SESSION 1P7

Monday, July 12, PM 1320-1700, Lauritsen Laboratory, Room 269

REMOTE SENSING I

Co-Chairpersons: A. K. Fung, University of Texas, Arlington, TX, USA, and
D. H. Hoekman, Wageningen Agricultural University, Wageningen, The Netherlands

- 1320 *K-Distributed Terrain Radar Clutter Simulation and Experiments*
Z. Belhadj, S. El Assad, and I. Lakkis, Laboratoire S2HF, Nantes, France
- 1340 *Relating Ground Truth Collection to Model Sensitivity*
F. Amar and A. K. Fung, Wave Scattering Research Center, University of Texas, Arlington, TX, USA,
M. A. Karam, NASA Goddard Space Flight Center, Greenbelt, MD, USA
E. Mougin, Centre d'Etude Spatiale des Rayonnements, Toulouse, France
- 1400 *Inversion of the Relevant Forest and Vegetation Parameters Using Neural Networks*
F. Amar, M. Dawson, and A. K. Fung, Wave Scattering Research Center, University of Texas, Arlington, TX, USA,
D. H. Hoekman, H. J. C. van Leeuwen, and G. J. Rijckenberg, Wageningen Agricultural University, Wageningen, The Netherlands
- 1420 *Monitoring of Environmental Conditions in Taiga Forests Using ERS-1 SAR During the Commissioning Phase*
E. Rignot, J. Way, and K. McDonald, JPL, California Institute of Technology, Pasadena, CA, USA
L. Viereck, C. Williams, P. Adams, C. Payne, and W. Wood, Institute of Northern Forestry, U.S. Forest Service, Fairbanks, AK, USA
- 1440 *Modifications to the Three-Component Classification Algorithm for SAR Data*
M. Moghaddam and A. Freedman, JPL, California Institute of Technology, Pasadena, CA, USA
- 1500 **Coffee Break**
- 1520 *Application of Phase Retrieval Techniques in Synthetic Aperture Radar Imaging*
T. Isernia, Università di Napoli Federico II, Napoli, Italy
G. Leone, Istituto di Ingegneria Elettronica, Università di Salerno, Fisciano, Italy,
V. Pascazio, ITTOEM, Istituto Universitario Navale, Napoli, Italy
R. Pierri, II Università di Napoli, Aversa, Italy
G. Schirinzi, IRECE, Consiglio Nazionale delle Ricerche, Napoli, Italy
- 1540 *Electromagnetic Scattering From Two Adjacent Objects*
K. Sarabandi and P. F. Polatin, Radiation Laboratory, University of Michigan, Ann Arbor, MI, USA
- 1600 *Removal of Specular Reflection in SAR Data*
H. C. Han and M. T. Lusk, Iowa State University, Ames, IA, USA
- 1620 *Determination of Noise Equivalent σ^0 Using Highly Correlated Repeat-Pass SAR Images*
J. Sun and A. Freeman, JPL, California Institute of Technology, Pasadena, CA, USA
- 1640 *A Super-Resolution Range-Doppler Imaging by Means of Prolate Spheroidal Wave Functions*
Z. Belhadj, S. El Assad, I. Lakkis, Laboratoire S2HF, Nantes, France

SESSION 1P8

Monday, July 12, PM 1300-1720, Keck Laboratories, Room 42

Organizers: T. M. Habashy and C. Torres-Verdín

ELECTROMAGNETIC INVERSE SCATTERING METHODS FOR GEOPHYSICAL APPLICATIONS

Co-Chairpersons: T. M. Habashy and C. Torres-Verdín, Schlumberger-Doll Research, Ridgefield, CT, USA

- 1300 *A Conductivity-Imaging Technique Using Transient EM Data*
 T. Wang, University of Utah, Salt Lake City, UT, USA
 M. L. Oristaglio, Schlumberger-Doll Research, Ridgefield, CT, USA
- 1320 *Low-Frequency Electromagnetic Imaging*
 K. H. Lee and G. Q. Xie, Lawrence Berkeley Laboratory, Berkeley, CA, USA
- 1340 *Practical Strategies for the Solution of Large Scale Inverse Problems*
 D. W. Oldenburg, University of British Columbia, Vancouver, B.C., Canada
- 1400 *Frequency-Domain Formulation of the Three-Dimensional, Electromagnetic, Inverse Problem Using Integral and Differential Equation Forward Solvers*
 G. A. Newman, Sandia National Laboratories, Albuquerque, NM, USA
- 1420 *2.5-Dimensional Geophysical Electrical Impedance Tomography*
 A. Allers, University of Delaware, Newark, DE, USA
 A. Sezginer, Schlumberger-Doll Research, Ridgefield, CT, USA
- 1440 *Estimation of 2-D Conductivity Distribution Based on Borehole Array Induction Measurements*
 O. Arikan, Schlumberger-Doll Research, Ridgefield, CT, USA
- 1500 **Coffee Break**
- 1520 *An Iterative Method for Inverse Scattering Problems Based on an Exact Gradient Search*
 S. Barkeshli, Space Systems/Loral, Palo Alto, CA, USA
- 1540 *A Linear Alternative to Classical Linearization for EM Inversion: Theory and Applications*
 E. Gómez-Treviño, CICESE, División de Ciencias de la Tierra, Ensenada, Baja California, Mexico
- 1600 *Multi-Dimensional Inversion of EM Geophysical Data Via a New Nonlinear Scattering Approximation*
 C. Torres-Verdín and T. M. Habashy, Schlumberger-Doll Research, Ridgefield, CT, USA
- 1620 *Active EM Imaging of Dielectric Targets: A Stochastic Approach*
 S. Caorsi, G. L. Gragnani, and M. Pastorino, University of Genoa, Genova, Italy
- 1640 *Reconstruction of Two-Dimensional Axisymmetric Inhomogeneous Media Using Induction Measurements*
 Q.-H. Liu, Schlumberger-Doll Research, Ridgefield, CT, USA
- 1700 *Joint 2D Multiparametrical Inversion of Electrical and Induction Logging Data*
 V. Druskin, Schlumberger-Doll Research, Ridgefield, CT, USA
 A. Kashik, L. Knizhnerman, O. Kosenkov, S. Shedrina, and E. Vaguina, Central Geophysical Expedition, Moscow, Russia
 T. Tamarchenko, Western Atlas International, Houston, TX, USA
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SESSION 1P9

Monday, July 12, PM 1340-1600, Beckman Laboratories, Room 24

Organizers: S. H. Yueh and F. K. Li

MICROWAVE REMOTE SENSING OF OCEAN WIND

Co-Chairpersons: S. H. Yueh and F. K. Li, JPL, California Institute of Technology, Pasadena, CA, USA

- 1340 *ERS-1 and Seasat Scatterometer Measurements of Ocean Winds: Model Functions and the Directional Distribution of Short Waves*
M. H. Freilich, Oregon State University, Corvallis, OR, USA
R. S. Dunbar, JPL, California Institute of Technology, Pasadena, CA, USA
- 1400 *Intercomparison of ERS-1 Scatterometer and SSM/I Winds*
F. J. Wentz, Remote Sensing Systems, Santa Rosa, CA, USA
- 1420 *K_u-Band Ocean Radar Backscatter Observations During SWADE*
S. V. Nghiem, F. K. Li, S. H. Lou, and G. Neumann, JPL, California Institute of Technology, Pasadena, CA, USA
- 1440 *The Development of a C-band RCS Model Function for Friction Velocity Using Coincident, Simultaneous Ku-band RCS Measurements*
D. Weissman, Hofstra University, Hempstead, NY, USA
- 1500 **Coffee Break**
- 1520 *Analysis of Ku-Band Cross Section at Low Incidence Angles*
B. Chapron, DRO-OS, IFREMER, Brest, France
V. Vandemark, NASA/Goddard Space Flight Center/Wallops Flight Facility, Wallops Island, VA, USA
- 1540 *Comparison of Remote Sensing Measurements with a Two-Scale Polarimetric Emission and Scattering Model for Sea Surfaces*
S. H. Yueh, S. V. Nghiem, R. Kwok, and F. K. Li, JPL, California Institute of Technology, Pasadena, CA, USA
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SESSION 2A1

Tuesday, July 13, AM 0820-1200, Beckman Institute Auditorium
Organizer: W.-M. Boerner

RADAR POLARIMETRY: BASIC THEORY

Co-Chairpersons: S. R. Cloude, University of York, England, and
A. I. Kozlov, MIIGA, Moscow, Russian Federation

- 0820 *Recent Advances in the Application of Group Theory to Polarimetry*
S. R. Cloude, University of York, England
- 0840 *Physical Reality of Radar Targets*
J. R. Huynen, P.Q. Research, Los Altos Hills, CA, USA
- 0900 *Comparison of Optimization Procedures for Radar/Lidar Scattering Matrices*
C.-L. Liu and W.-M. Boerner, University of Illinois, Chicago, IL, USA
E. Lueneburg, DLR Institute for Radio Frequency Technology, Oberpfaffenhofen, FRG
M. Tanaka, University of Oita, Kyushu, Japan
- 0920 *Systematic Definition of Bases and Their Transformations in Antenna Polarization State Formalism*
D. H. O. Bebbington, University of Essex, Wivenhoe Park, Colchester, UK
- 0940 *The Hermitian Antilinear Back Scatter Operator and Its Representations*
E. Lueneburg, DLR Institute for Radio Frequency Technology, Oberpfaffenhofen, Germany
- 1000 **Coffee Break**
- 1020 *Polarimetric Radar Linear Vector Space Theory*
W. A. Holm, Georgia Institute of Technology, Atlanta, GA, USA
- 1040 *Development of "Optimal Polarimetric Contrast Enhancement Coefficients: (OPCEC)" for the Analysis of Depolarization Due to Rain, Ice and Surface Scatter Utilizing POL-RAD and POL-SAR Measurements*
W.-M. Boerner, M. Tanaka, Y. Yamaguchi, H.-J. Eom, and E. Lueneburg, University of Illinois, Chicago, IL, USA
- 1100 *Complete Cancellation of an Unpolarized Clutter in a Mono- or Bistatic Radar*
Z. H. Czy, Telecommunications Research Institute, Warsaw, Poland
- 1120 *Bistatic Versus Backscatter Polarimetric Signatures*
F. Amar and A. K. Fung, University of Texas, Arlington, TX, USA
- 1140 *Polarizational Structure of Superwide Band Signals for Obtaining the Dispersion Characteristics of Radiolocation Targets*
V. A. Sarychev, Leninetz, Sankt-Petersburg, Russian Federation
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SESSION 2A2

Tuesday, July 13, AM 0840-1120, Baxter Lecture Hall
Organizer: D. A. McNamara

THE SYNTHESIS OF ANTENNA APERTURE DISTRIBUTIONS

Co-Chairpersons: D. A. McNamara, University of Pretoria, Pretoria, South Africa, and
S. A. Long, University of Houston, Houston, TX, USA

- 0840 *A General Approach to the Synthesis of Aperture Antennas*
O. M. Bucci and G. D'Elia, Università 'Federico II' di Napoli, Naples, Italy
- 0900 *A Novel Three-Parameter (3-P) Aperture Distribution for Antenna Synthesis*
Y. Rahmat-Samii and D. W. Duan, University of California, Los Angeles, CA, USA
- 0920 *A New Application of Pattern Synthesis Techniques in Adaptive Arrays*
C.-Y. Tseng, University of Southern California, Los Angeles, CA, USA
- 0940 *Synthesis of Multiple Overlapping Contoured Beam Reflector Antenna Systems With Orthogonality Constraints or Coupling Loss*
P. Balling, ASC, Taastrup, Denmark
S. Badessi, ESA/ESTEC, Noordwijk, The Netherlands
A. Lindley, INTELSAT, Washington, DC, USA
- 1000 **Coffee Break**
- 1020 *Extensions to a Direct Transformation Technique for Synthesising Planar Arrays With Contoured Beams*
E. Botha and D. A. McNamara, University of Pretoria, Pretoria, South Africa
- 1040 *Synthesis of Very Low Sidelobe Regions in the Radiation Pattern of an Array Antenna*
M. A. Mitchell, Georgia Tech Research Institute, Atlanta, GA, USA
J. R. Sanford, Huber and Suhner, AG, Herisau, Switzerland
- 1100 *Reflector Antenna Synthesis*
R. Jørgensen, TICRA, Copenhagen, Denmark
M. Sabbadini, ESA/ESTEC, Noordwijk, The Netherlands
-

SESSION 2A3

Tuesday, July 13, AM 0820-1140, Steele Laboratory, Room 102

COMPUTATIONAL ELECTROMAGNETICS III

Co-Chairpersons: J. R. Mosig, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, and
Y. L. Chow, University of Waterloo, Waterloo, Ontario, Canada

- 0820 *Use the Finite Difference Method to Characterize Open Waveguides: Application to Usual "T.E.M." Lines Without Screening*
E. Rius, J. A. Autret, and N. Tanguy, Laboratoire d'Electronique et Systèmes de Télécommunication-URA CNRS, Brest, France
P. Jarry, E.N.S.R.B., Talence, France
- 0840 *A Finite Element Analysis of Waveguide Loaded Cavities*
H. Igarashi, Y. Sugawara, and T. Honma, Hokkaido University, Sapporo, Japan
- 0900 *Moment Method Solution of the Input Impedance of a Dielectric-Coated Probe-Excited Semi-infinite Rectangular Waveguide*
P. S. Kooi, M. S. Leong, T. S. Yeo, and S. L. Ho, National University of Singapore, Singapore
- 0920 *A Boundary-Element Technique for Calculating the Inductance and Resistance of Finite Planes With Arbitrary Holes*
M. J. Tsuk, Digital Equipment Corporation, Maynard, MA, USA
C. Gordon, Digital Equipment Corporation, Hudson, MA, USA
- 0940 *Analysis of Whispering Gallery Modes Using Finite Integration Method*
S. T. Chew, Defense Science Organisation, Singapore
M. S. Leong and P. S. Kooi, National University of Singapore, Singapore
- 1000 **Coffee Break**
- 1020 *Computation of Static and Quasistatic Electromagnetic Fields Using Asymptotic Boundary Conditions*
Q. Chen, A. Konrad, and P. P. Biringer, University of Toronto, Toronto, Ontario, Canada
- 1040 *Numerical Projection Method for the Corrugated Structures Research*
M. V. Tupikov, Moscow State University, Moscow, Russian Federation
- 1100 *Advanced Technology for Numerical Modelling and Analysis of EM-Fields in 3D Inhomogeneous Media Using PC*
V. V. Spichak, Geophysical Research Center, Moscow, Russia
- 1120 *Numerical Analysis of Electromagnetic Wave Diffraction on Cylindrical Bodies of Piecewise-Smooth Cross-Section*
Z. Nazarchuk, Karpenko Physico-Mechanical Institute of Ukrainian Academy of Sciences, Lviv, Ukraine
Z. Khmil, Institute for Trade and Economics, Lviv, Ukraine

SESSION 2A4

Tuesday, July 13 AM 0800-1200, Downs Laboratory, Room 107

SCATTERING AND DIFFRACTION I

Co-Chairpersons: P. L. E. Uslenghi, University of Illinois, Chicago, IL, USA, and
D. B. Ge, Xidian University, Xi'an, PRC

- 0800 *Scattering of Electromagnetic Radiation by Nonconnected, Heterogeneous Bianisotropic Structures*
D. K. Cohoon, Glen Mills, PA, USA
- 0820 *Scattering Electromagnetic Waves by a Dielectric Grating With Planar Slanted-Fringes*
T. Yamasaki, H. Tanaka, T. Hinata, and T. Hosono, Nihon University, Tokyo, Japan
- 0840 *Perfectly Conducting Lamellar Gratings, Babinet's Principle and Equivalent Circuits*
L. C. Botten, University of Technology, Sydney, Australia
R. C. McPhedran, University of Sydney, Sydney, Australia
G. W. Milton, New York University, New York, NY, USA
- 0900 *Scattering From an Electrically Large Target Beneath a Layer of Random Media*
R. G. Atkins, R.T Shin, and J. A. Kong, MIT, Cambridge, MA, USA
- 0920 *Resonant Attenuation in Electromagnetic Wave Scattering From Conducting Spheres and Elongated Objects*
H. Überall, Catholic University of America, Washington, DC, USA, and David Taylor Research Center, Annapolis, MD, USA
C. R. Schumacher, David Taylor Research Center, Annapolis, MD, USA
X. L. Bao, Catholic University of America, Washington, DC, USA
- 0940 *Radiation and Scattering by Antennas Attached to Coated Bodies of Revolution*
Y. Yuan and J. A. Kong, MIT, Cambridge, MA, USA,
P. S. Kao and R. T. Shin, MIT Lincoln Laboratory, Lexington, MA, USA
- 1000 **Coffee Break**
- 1020 *Spherical Wave Near-Field Illumination Radar Cross Section Measurement*
J. Palau, A. Broquetas, L. Jofre, and A. Cardama, ETS Ingenieros Telecomunicación Barcelona UPC, Barcelona, Spain
- 1040 *A Lowerbound Formula for the Bistatic Radar Cross Section of an Airborne Object*
R. M. Bevensee, National University of Singapore, Singapore
- 1100 *Fourier Diffraction Theorem Under WKB Approximation and Extended Backpropagation Algorithm*
D. B. Ge and L. Q. Guo, Xidian University, Xi'an, PRC
- 1120 *A Rigorous Solution of Perturbation of Foreign Objects to External Electric Field*
Y. Liu, Beijing University of Posts and Telecommunication, Beijing, PRC
- 1140 *The Method of Determination of Scattering Frequencies of Arbitrary Profile Unclosed Cylindrical Screens Systems*
Y. V. Svischov, Institute of Radiophysics and Electronics Academy of Science of Ukraine, Kharkov, Ukraine

SESSION 2A5

Tuesday, July 13, AM 0820-1200, Downs Laboratory, Room 103

INHOMOGENEOUS MEDIA

Co-Chairpersons: S. S. Saatchi, JPL, California Institute of Technology, Pasadena, CA, USA, and
D. A. de Wolf, Virginia Polytechnic Institute and Virginia Polytechnic Institute, Blacksburg, VA, USA

- 0820 *Electromagnetic Waves Channeling in the Atmosphere*
V. Freilikher, Bar-Ilan University, Ramat-Gan, Israel
- 0840 *Dimension of Reflection Coefficient*
S. A. Bulgakov, Institute of Radio Astronomy, Kharkov, Ukraine
V. V. Konotop, Universidade da Madeira, Funchal, Portugal
L. Vázquez, Universidad Complutense, Madrid, Spain
- 0900 *Imaging Small Defects With Diffusive Photons: A Perturbation Theory*
F. Zeng and S. Feng, University of California, Los Angeles, CA, USA
- 0920 *Effective-Medium Permittivity in Particulate Media at Low Densities and Frequencies: A Unified Approach*
D. A. de Wolf, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA
- 0940 *Active Radiative Transfer Theory Under the Continuous Random Medium Approach*
H. C. Han, Iowa State University, Ames, IA, USA
J. A. Kong, MIT, Cambridge, MA, USA
- 1000 **Coffee Break**
- 1020 *Intensity and Polarization of Light Scattered by Size Distributions of Randomly Oriented Nonspherical Particles*
M. I. Mishchenko and L. D. Travis, NASA Goddard Institute for Space Studies, New York, NY, USA
- 1040 *Analysis of Single-Fold Statistics of Coherent Scattered Light for the Characterisation of Immiscible Water Pollutants*
K. I. Hopcraft, University of Nottingham, Nottingham, UK
- 1100 *Parametric Scattering of Polaritons in Randomly Inhomogeneous Media*
V. G. Baryshevsky, A. K. Gilev, M. G. Livshitz, L. E. Lozner, G. Ya. Slepian, and I. V. Yarosh, Research Institute for Nuclear Problems, Minsk, Belarus
Yu. A. Voitukevich, Grodno State University, Grodno, Belarus
- 1120 *On Certain Approximation for Radiation Transfer Equation With Cylindrical Symmetry*
V. M. Ol'khov, Astro Space Center, Lebedev Physical Institute, Moscow, Russia
- 1140 *The Effective Permittivity of Strongly Fluctuating Statistically Inhomogeneous Media*
N. P. Zhuck, Kharkov State University, Kharkov, Ukraine
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SESSION 2A6

Tuesday, July 13, AM 0840-1100, Downs Laboratory, Room 11

Organizer: H. Kikuchi

**BRIDGES FROM ELECTROMAGNETIC THEORY TO CIRCUIT THEORY:
HOW TO DESCRIBE ELECTROMAGNETIC PHENOMENA**

Co-Chairpersons: H. Kikuchi, Nihon University, Tokyo, Japan, and
W. K. Kahn, George Washington University, Washington, DC, USA

- 0840 *Network Theory of Antennas*
W. K. Kahn, George Washington University, Washington, DC, USA
- 0900 *Unified Approach to an Active Distributed Parameter Line Theory From Electromagnetic Theory and Its Application to a Wire Above the Dissipative Ground Illuminated by a Plane Wave*
H. Kikuchi and H. Inaba, Nihon University, Tokyo, Japan
- 0920 *Distributed Parameter Line Representation of the Zenneck Wave and/or an Extended Zennek Wave Along the Interface Between Two Media*
H. Kikuchi, T. Matsumoto, and E. Miura, Nihon University, Tokyo, Japan
- 0940 *Solutions of EM Problems Using Equivalent Circuits*
R. L. Gardner, Phillips Laboratory/WST, Kirtland AFB, NM, USA
- 1000 **Coffee Break**
- 1020 *General Circuit Representation of Electromagnetic Phenomena $L(M)+C//R$ Lattice Concept and Applications for Lightning Problems*
M. Okada, Mitsubishi Electric Corporation, Amagasaki, Japan
- 1040 *Transformer—The Bridge From Electromagnetic Theory to Circuit Theory*
S. Alfás, ELKRAFT, Ballerup, Denmark
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SESSION 2A7

Tuesday, July 13, AM 0800-1120, Lauritsen Laboratory, Room 269

REMOTE SENSING II

Co-Chairpersons: L. M. H. Ulander, Chalmers University of Technology, Göteborg, Sweden, and
K. Sarabandi, University of Michigan, Ann Arbor, MI, USA

- 0800 *Topographic Mapping Using a Monopulse SAR System*
M. Zink and H. Öttl, DLR, German Aerospace Research Establishment, Institute for
Radio Frequency Technology, Oberpfaffenhofen, Germany
A. Freeman, JPL, California Institute of Technology, Pasadena, CA, USA
- 0820 *Non Linear Spectral Mixing Models for Vegetative and Soil Surfaces*
C. C. Borel, Los Alamos National Laboratory, Los Alamos, NM, USA
- 0840 *Scattering Formulation for Long, Thin Cylinders of Arbitrary Cross-Section and Electrical Length*
J. M. Stiles, K. Sarabandi, T. B. A. Senior, F. T. Ulaby, Radiation Laboratory, University
of Michigan, Ann Arbor, MI, USA
- 0900 *Integrated Display of Multi-Sensor Geophysical and Electromagnetic Flight Data*
V. E. Delnore, Lockheed Engineering and Sciences Company, Hampton, VA, USA
E. M. Bracalente and S. D. Harrah, NASA Langley Research Center, Hampton, VA,
USA
C. L. Britt, Jr., Research Triangle Institute, Hampton, VA, USA
- 0920 *Dielectric Properties of Rocks at Microwave Frequencies*
R. Papson and I. Chatterjee, University of Nevada, Reno, NV, USA
- 0940 *Reconstruction of Dielectric Constant of Cylindrical Object From Bistatic Scattering Width*
T. Takenaka, Nagasaki University, Nagasaki, Japan
D. J. N. Wall, University of Canterbury, Christchurch, New Zealand
M. Tanaka, Oita University, Oita, Japan
H. Harada, Nippon Bunri University, Oita, Japan
- 1000 **Coffee Break**
- 1020 *Description and Availability of Airborne Doppler Radar Data*
S. D. Harrah, E. M. Bracalente, and P. R. Schaffner, NASA Langley Research Center,
Hampton, VA, USA
E. G. Baxa, Clemson University, Clemson, SC, USA
- 1040 *Remote Sensing of the Lower Atmosphere: Design and Development of Doppler SODAR*
D. N. Rao, T. R. V. Kumar, P. Kishore, T. G. Faizuddin, and K. K. Reddy, S. V.
University, Tirupati, India
- 1100 *Nondestructive Evaluation Using Time-Domain Synthetic Aperture Radar*
M. T. Lusk and H. C. Han, Iowa State University, Ames, IA, USA
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SESSION 2A8

Tuesday, July 13, AM 0820-1220, Keck Laboratories, Room 42

Organizer: A. K. Jordan

ELECTROMAGNETIC INVERSE SCATTERING

Co-Chairpersons: A. K. Jordan, Naval Research Laboratory, Washington, DC, USA, and
J. J. Xia, Schlumberger-Doll Research, Ridgefield, CT, USA

- 0820 *Iterative Numerical Solution of Nonlinear Electromagnetic Inverse Scattering*
M. Brandfass and K. J. Langenberg, University of Kassel, Kassel, Germany
- 0840 *A Global Guidance Condition for Optical Waveguide Design*
J. J. Xia, Schlumberger-Doll Research, Ridgefield, CT, USA
A. K. Jordan, Naval Research Laboratory, Washington, DC, USA
J. A. Kong, Research Laboratory of Electronics, MIT, Cambridge MA, USA
- 0900 *Synthesis of Integrated Photonic Devices: An Inverse Scattering Approach*
L. S. Tamil, University of Texas at Dallas, Richardson, TX, USA
- 0920 *Inverse Scattering Problem for Nonlinear and Stochastic Media Using the Distorted-Wave Born Approximation*
F. C. Lin and M. A. Fiddy, University of Massachusetts, Lowell, MA, USA
- 0940 *An Improved Sobolev-Space Solution for the Inversion of Microwave Radiometry Data*
F. Bardati and P. Tognolatti, Università di Roma "Tor Vergata," Roma, Italy
- 1000 **Coffee Break**
- 1020 *Equivalent Current Reconstruction in Electromagnetic Imaging of Dielectric Bodies*
Y. M. Qin and I. R. Ciric, University of Manitoba, Winnipeg, Manitoba, Canada
- 1040 *Imaging of Imperfect Bodies by Surface Currents*
T. Sengör, Yildiz Technical University, Istanbul, Turkey
- 1100 *An Adaptive Reconstruction Algorithm for 2-D Microwave Imaging*
S. Paker and B. Yazgan, Istanbul Technical University, Istanbul, Turkey
- 1120 *Profile Inversion Using the Polarization Parameters Domain Approach*
D. O. Batrakov and N. P. Zhuck, Kharkov State University, Kharkov, Ukraine
- 1140 *A Novel Non-linear Inverse Scattering Method Applied to Simulated and Laboratory Data*
D. T. Borup, S. A. Johnson, and J. W. Wiskin, University of Utah, Salt Lake City, UT, USA
- 1200 *Reconstruction of Two-Dimensional Permittivity Image Using Modified Reflection Mode Born Approximation Method*
Y. Zhang, D. T. Borup, and S. A. Johnson, Advanced Imaging Methods Laboratory, University of Utah, Salt Lake City, UT, USA
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SESSION 2A9

Tuesday, July 13, AM 0820-1200, Beckman Laboratories, Room 24
Organizer: Q.-H. Liu

ELECTROMAGNETIC SUBSURFACE SENSING I

Co-Chairpersons: Q.-H. Liu and O. Arikan, Schlumberger-Doll Research, Ridgefield, CT, USA

- 0820 *Fast 2-D Electromagnetic Forward Modeling Methods*
T. Tamarchenko, Western Atlas International, Atlas Wireline Services, Houston, TX, USA
V. Druskin, Schlumberger-Doll Research, Ridgefield, CT, USA
- 0840 *Temporal and Spatial Wave Shaping for Transmission into a Lossy Half Space*
K. A. Nabulsi, King Abdulaziz University, Jeddah, Saudi Arabia
J. R. Wait, University of Arizona, Tucson, AZ, USA
- 0900 *Frequency-Domain Modeling of Three-Dimensional Electromagnetic Fields for Controlled Sources Using Staggered Grids*
G. A. Newman, Sandia National Laboratories, Albuquerque, NM, USA
- 0920 *Development of Electrical Resistance Tomography at Lawrence Livermore National Laboratory*
W. Daily and A. Ramirez, Lawrence Livermore Laboratory, Livermore, CA, USA
- 0940 *Detection and Location of Buried Dielectric Objects Using Cross-Borehole Sensing*
G. A. Ellis and I. C. Peden, University of Washington, Seattle, WA, USA
- 1000 **Coffee Break**
- 1020 *Cross-Polarization Borehole Radar Measurements*
M. Sato, T. Ohkubo, and H. Niitsuma, Tohoku University, Sendai, Japan
- 1040 *Using CG-FFHT Method to Solve the Borehole Inverse Problem at Induction Frequencies*
W. C. Chew, University of Illinois, Urbana, IL, USA
Q. -H. Liu, Schlumberger-Doll Research, Ridgefield, CT, USA
- 1100 *A Born Extension With Super-Resolution for One Dimensional Profile Inversion*
D. G. Dudley and C. J. Trantanella, University of Arizona, Tucson, AZ, USA
K. A. Nabulsi, King Abdulaziz University, Jeddah, Saudi Arabia
- 1120 *An FM-CW Radar Detection in Sandy Ground*
Y. Yamaguchi and M. Sengoku, Niigata University, Niigata, Japan
H.-J. Eom, Korea Advanced Institute of Science and Technology, Teajon, Korea
W.-M. Boerner, University of Illinois, Chicago, IL, USA
- 1140 *Imaging a Two-Dimensional Axisymmetric Inhomogeneous Medium Using a TM Resistivity Tool*
Q.-H. Liu, Schlumberger-Doll Research, Ridgefield, CT, USA
-

SESSION 2P1

Tuesday, July 13, PM 1320-1700, Beckman Institute Auditorium

Organizer: W.-M. Boerner

RADAR POLARIMETRY: VECTOR SCATTERING

Co-Chairpersons: F. A. Molinet, Sté Mothesim, Le Plessis-Robinson, France, and
A. Sarychev, Leninetz, Sankt-Petersburg, Russian Federation

- 1320 *Recent Advances of Polarimetric Analysis on Vector Wave Radar Target Scattering*
F. A. Molinet, Sté Mothesim, Le Plessis-Robinson, France
- 1340 *Recent Advances in Polarimetric Inverse Scattering of Complex Structured Radar Targets Using the Geometrical and Physical Optics and the Geometrical and Physical Theory of Diffraction*
F. A. Molinet, Sté Mothesim, Le Plessis-Robinson, France
W.-M. Boerner, University of Illinois, Chicago, IL, USA
- 1400 *Investigation of Radiowave Propagation by Mueller Matrix Through Anisotropic Dielectric Layer Along a Slanting Path*
E. Skirta and J. Saillard, Laboratoire S2HF, IRESTE, Nantes, France
- 1420 *Recent Advances in Vector Radiative Transfer Theory for Random Media With Random Rough Surfaces and Discrete Particles*
C. M. Lam and A. Ishimaru, University of Washington, Seattle, WA, USA
- 1440 *Matrix Doubling Procedures for the Analysis of Mueller and Covariance Matrices of Internal Emission From a Layer of Irregular Boundaries and Embedded Random Scatterers*
H.-J. Eom, Korea Advanced Institute of Science and Technology, Taejeon, So. Korea
W.-M. Boerner, University of Illinois, Chicago, IL, USA
- 1500 **Coffee Break**
- 1520 *Polarimetric Radar Statistics: An Overview on Recent Advances in Russia and at MIIGA*
A. I. Kozlov and A. I. Logvin, MIIGA, Moscow, Russia
- 1540 *Two Full Polarimetric Descriptors of the Sea Surface Backscattering: The Huynen Vector and the Euler Vector*
D. Laurent and J. Saillard, Laboratoire S2HF, IRESTE, Nantes, France
- 1600 *Multispectral Wideband Polarimetric Radar Target Characteristics*
V. A. Sarychev, Leninetz, Sankt-Petersburg, Russian Federation
A. I. Kozlov and A. I. Logvin, MIIGA, Moscow, Russian Federation
W.-M. Boerner, University of Illinois, Chicago, IL, USA
- 1620 *Polarization Aspects of Weak Electromagnetic Field Localization in Retroreflection*
W. G. Egan, York College/City University of New York, Jamaica, NY, USA
- 1640 *Microwave Emission From a Dielectric-Loaded Semicircular Trough in a Conducting Plane*
H.-J. Eom and T. J. Park, Korea Advanced Institute of Science and Technology, Taejeon, So. Korea
Y. Yamaguchi, Niigata University, Niigata, Japan
W.-M. Boerner, University of Illinois, Chicago, IL, USA

SESSION 2P2

Tuesday, July 13, PM 1320-1700, Baxter Lecture Hall

MICROSTRIP AND PRINTED ANTENNAS

Co-Chairpersons: N. G. Alexopoulos, University of California, Los Angeles, CA, USA, and
C. H. Chen, TRW Electronic Systems Group, Redondo Beach, CA, USA

- 1320 *Study of Elliptical Annular Microstrip Antenna Using Full Mathieu Formulation*
K. Sun, Jackson State University, Jackson, MS, USA
J. M. Tranquilla, University of New Brunswick, Fredericton, New Brunswick, Canada
- 1340 *Accurate Calculation of Resonance Frequency of Microstrip Antenna With Superstrate*
H. G. Sadr and A. K. Verma, University of Delhi, New Delhi, India
I. B. Verma, Delhi Institute of Technology, Dehli, India
- 1400 *Novel Compact Printed Circuit Antennas*
M. Cai, P. S. Kooi, and M. S. Leong, National University of Singapore, Singapore
- 1420 *Characterization of Novel Multilayer Microstrip Structures Using a Matched Load Simulation Technique*
E. K. L. Yeung and J. C. Beal, Queen's University, Kingston, Ontario, Canada
Y. M. M. Antar, Royal Military College, Kingston, Ontario, Canada
- 1440 *An Investigation of Pattern Enhancement Techniques for Microstrip Patch and Slot Antennas*
M. J. Vaughan and R. C. Compton, Cornell University, Ithaca, NY, USA
- 1500 **Coffee Break**
- 1520 *An Analytical Calculation Technique for the Cell-Cell Interactions in the Method of Galerkin Analysis of Microstrip-Slot Circuits*
J. Sercu and N. Faché, University of Ghent, Laboratory of Electromagnetism and Acoustics, Ghent, Belgium
D. De Zutter, NFWO and University of Ghent, Laboratory of Electromagnetism and Acoustics, Ghent, Belgium
- 1540 *Matching With the Feed Lines Taking into Consideration the Mutual Coupling in the Microstrip Array Antennas*
S. L. Prosvirnin, I. I. Reznik, D. G. Seleznyov, and O. I. Yanson, Ukrainian Academy of Sciences, Kharkov, Ukraine
- 1600 *Ring of Overlapped Microstrip Hybrid Couplers*
W. Marczewski, Polish Academy of Sciences, Space Research Center, Warsaw, Poland
- 1620 *The Given Current Approach to Electrodynamics Theory of Microstrip Antennas: Substantiation of Using and Accuracy of Calculations*
S. N. Vorob'ev and S. L. Prosvirnin, Academy of Sciences of the Ukraine, Kharkov, Ukraine
- 1640 *A Method for Analyzing Microstrip Antenna*
M. Zhiji, L. Guizhen, and G. Xiaomei, Beijing Broadcasting Institute, Beijing, PRC

SESSION 2P3

Tuesday, July 13, PM 1340-1620, Steele Laboratory, Room 102

Organizer: A. Elsherbeni

RECENT ADVANCES IN THE COMPUTATION OF THE SCATTERING AND DIFFRACTION OF ELECTROMAGNETIC WAVES

Co-Chairpersons: A. Elsherbeni, University of Mississippi, University, MS, USA, and
Y. Rahmat-Samii, University of California, Los Angeles, CA, USA

- 1340 *On the Present Status of the Finite-Volume Time-Domain Method*
A. H. Mohammadian, V. Shankar, and W. F. Hall, Rockwell International Science Center, Thousand Oaks, CA, USA
- 1400 *Computation of Scattering From Complex Surface/Wire Structures: A Hybrid TDFV and FDTD Approach*
M. A. Jensen and Y. Rahmat-Samii, University of California, Los Angeles, CA, USA
- 1420 *Domain Decomposition Methods for the Solution of Large Scattering Problems*
R. Kastner, Tel Aviv University, Tel Aviv, Israel
- 1440 *Discrete Boundary Impulse Response—A Transparent Boundary for FDTD*
M. Melton and J. E. Lebaric, Rose-Hulman Institute of Technology, Terre Haute, IN, USA
- 1500 **Coffee Break**
- 1520 *Line Source Excitation of a Dielectric Cylinder Embedded in Conducting Wedges by the Moment and Path Integral Methods*
R. Nevels, Z. Wu, and C. Huang, Texas A&M University, College Station, TX, USA
A. Elsherbeni, University of Mississippi, University, MS, USA
- 1540 *Simulation of Three-Dimensional Scatterers by a System of Conducting or Dielectric Spheres*
A.-K. Hamid, I. R. Ciric, and M. Hamid, University of Manitoba, Winnipeg, Manitoba, Canada
- 1600 *Scattering of Matched FM Signals From Inhomogeneous Ionized Diffusing Cylinders—A New Technique for Meteor-Burst Communications*
S. E. El-Khamy, H. A. El-Kamchouchi, and S. M. Abd-Al-Rahman, Alexandria University, Alexandria, Egypt

SESSION 2P4

Tuesday, July 13, PM 1320-1720, Downs Laboratory, Room 107

SCATTERING AND DIFFRACTION II

Co-Chairpersons: R. E. Collin, Case Western Reserve University, Cleveland, OH, USA, and
C. Chan, University of Washington, Seattle, WA, USA

- 1320 *High-Frequency Scattering Components of a Finite Metallic Cone*
K. T. Selvan, K. G. Thomas, and S. K. Das, SAMEER, Centre for Electromagnetics,
Madras, India
- 1340 *A Uniform Solution for the Transition Region of a Circular Cylinder Coated With Dielectric of Arbitrary Thickness*
M. T. Yaqoob and E. Khan, Government College, Bhakkar, Pakistan
- 1400 *A New Algorithm for Computing the Scattering by an Infinite Cylinder*
R. T. Wang, Space Astronomy Laboratory, Institute for Space Science and Technology,
Gainsville, FL, USA
- 1420 *Extinction and Scattering by Dielectric Finite Cylinders—Comparison of Microwave Scattering Measurements With Theory*
R. T. Wang, Space Astronomy Laboratory, Institute for Space Science and Technology,
Gainsville, FL, USA
- 1440 *Three-Dimensional Light-Beam Scattering From Pit Models of Optical Discs*
T. Kojima and Y. Morikawa, Osaka Electro-Communication University, Osaka, Japan
- 1500 **Coffee Break**
- 1520 *A New Formalism to Compute the Electromagnetic Field Scattered by a Conducting Surface*
M. C. Recchioni and F. Zirilli, Università di Roma "La Sapienza," Rome, Italy
- 1540 *Quantum Microphysical Processes in Electromagnetic Technology Systems*
L. A. Steinert, Physical Synergetics Institute, Long Beach, CA, USA
- 1600 *On the Schwarz Functions in the Two-Dimension Problems of the Wave Scattering*
V. F. Apelt'cin, Moscow St. University, Moscow, Russia
- 1620 *Electromagnetic Scattering of Obliquely Incident Waves by a Moving Plasma Cylinder*
J. Ge and W. Lin, University of Electronic Science and Technology of China, Chengdu,
PRC
Z. Tang and W. Wan, Northwestern Polytechnical University, Xi'an, PRC
- 1640 *The Operator Lorentz-Lorenz Formula for Non-Point Particles*
L. A. Apresyan, Mintz Radio Engineering Institute of Russian Academy of Sciences,
Moscow, Russia
- 1700 *Some Generalizations of Geometric Optical Approach in the Problem of Wave Scattering by Localized Smooth Inhomogeneities*
Z. I. Feizulin and A. V. Moroz, Mintz Radio Engineering Institute of Russian Academy
of Sciences, Moscow, Russia

SESSION 2P5

Tuesday, July 13, PM 1340-1620, Downs Laboratory, Room 103

ELECTROMAGNETIC INTERACTIONS WITH SPECIAL MEDIA I

Co-Chairpersons: H. Überall, U. S. Navy—ASEE Distinguished Summer Faculty Fellow, and Catholic University of America, Washington, DC, USA, and
S. Barkeshli, Space Systems/Loral, Palo Alto, CA, USA

- 1340 *Representation of Fields in Faraday Chiral Media*
W. S. Weiglhofer, University of Glasgow, Glasgow, Great Britain
- 1400 *Effective Medium Theory and the Attenuation of Graphite Fiber Composites*
H. Überall, U. S. Navy—ASEE Distinguished Summer Faculty Fellow, and Catholic University of America, Washington, DC, USA
B. F. Howell and E. L. Diamond, Naval Surface Warfare Center, Annapolis, MD, USA
- 1420 *Numerical and Analytical Analysis of Elastic Wave Fields in Anisotropic Media: The Caustic of Surface Skimming Bulk Wave*
M. Benslama, Laboratoire Microondes ENSEEIHT, Toulouse, France
M. Planat, Laboratoire de Physique et Métrologie des Oscillateurs, rattaché à l'Université de Franche Comté, Besançon, France
- 1440 *Electric Field Behavior in Nonlinear Media*
R. Donnelly, Memorial University, St. John's, Newfoundland, Canada
R. W. Ziolkowski, University of Arizona, Tucson, AZ, USA
- 1500 **Coffee Break**
- 1520 *On Mathematical Representation of Polarization Vector in Nonlinear Dielectric Medium*
S. P. Tao, Beijing University of Posts and Telecommunication, Beijing, PRC
- 1540 *Bistable Switching Effects at Nonlocal Nonlinear Interfaces*
W. Nasalski, Polish Academy of Science, Warsaw, Poland
- 1600 *Electromagnetic Field Focussing in Non-Stationary Media*
A. G. Nerukh and I. Yu. Shavorykina, Kharkov Institute of Radioelectronics, Kharkov, Ukraine
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 SESSION 2P6

Tuesday, July 13, PM 1320-1720, Downs Laboratory, Room 11
 Organizer: A. Priou

NEW TRENDS IN ELECTROMAGNETIC THEORY

Co-Chairpersons: M. Howyan, French Ministry of Defense, Paris, France, and
 J. A. Kong, MIT, Cambridge, MA, USA

- 1320 *Electromagnetic Wave Scattering by a Fractal Structure*
 W. C. Au, R. T. Shin, and J. A. Kong, MIT, Cambridge, MA, USA
- 1340 *Electromagnetic Wave and Fractal Space: Causality, Non Integer Derivative and Hyperbolic Geometry*
 F. Héliodore and A. Le Méhauté, Alcatel Alsthom Recherche, Marcoussis, France
 P. Riot, STCAN, Paris, France
- 1400 *The Waveguide Behavior of Randomly Layered Media*
 W. Kohler, Virginia Polytechnic Institute, Blacksburg, VA, USA
 G. Papanicolaou, Courant Institute of Mathematical Sciences, NYU, New York, NY, USA
 B. White, Exxon Research and Engineering Co., Annandale, NJ, USA
- 1420 *Photonic Band Structures for a Lattice of Dielectric Rods: Localized Impurities*
 F. M. Mueller, L. Daemen, A. M. Clogston, and C. J. Maggiore, Los Alamos National Laboratory, Los Alamos, NM, USA
- 1440 *Symmetries of the Constitutive Matrix*
 H. N. Kritikos, University of Pennsylvania, Philadelphia, PA, USA
 C. E. Baum, Kirtland AFB, NM, USA
- 1500 **Coffee Break**
- 1520 *Polarization Dependence in Geometrical and Physical Optics*
 F. Molinet, Sté Mothesim, Le Plessis-Robinson, France
- 1540 *Shadow Radiation and Radiolocation of Invisible Objects*
 P. Ya. Ufimtsev, University of California, Los Angeles, CA, USA
- 1600 *Aperture Realizations of Localized Wave Solutions*
 R. W. Ziolkowski, University of Arizona, Tucson, AZ, USA
- 1620 *New Analytical Approach of the Electronic Transient Effects Induced on Semi-Conducting Material Surface by Different E-M Missiles Patterns*
 J.-F. Eloy, French Atomic Energy Commission, Le Barp, France
- 1640 *Properties of Eigenterms of the Impedance Integral Equation*
 C. E. Baum, Phillips Laboratory/WSR, Kirtland AFB, NM, USA
- 1700 *Gauge Fields and Vortices in Superconductors*
 A. K. Jordan, Naval Research Laboratory, Washington, DC, USA
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SESSION 2P7

Tuesday, July 13, PM 1340-1640, Lauritsen Laboratory, Room 269

DEVICES AND CIRCUITS I

Co-Chairpersons: K. Chang, Texas A&M University, College Station, TX, USA, and
R. T. Shin, MIT, Cambridge, MA, USA

- 1340 *Transient Analysis of Dispersive Signal Lines Terminated With CMOS Devices*
M. Yamaguchi, Q. Gu, Y. E. Yang, and J. A. Kong, Research Laboratory of Electronics,
MIT, Cambridge, MA, USA
- 1400 *Coupled Noise Analysis for Adjacent Vias in Multilayered Digital Circuits*
Q. Gu, M. A. Tassoudji, S. Y. Poh, R. T. Shin, and J. A. Kong, Research Laboratory of
Electronics, MIT, Cambridge, MA, USA
- 1420 *Virtual Modes Excitation in Thin Silver Films*
M. Gadenne, P. Gadenne, and J. Lafait, Laboratoire d'optique des solides, Université de
Pierre et Marie Curie, Paris, France
P. Sheng, M. Zhou, and A. F. Ruppert, Exxon Research and Engineering Co.,
Annandale, NJ, USA
- 1440 *Nonlinear Modeling of Switching, Turn-On Delays, and Chaos in Josephson Junctions and
Superconducting Logic Devices*
M. R. Chatterjee and A. Zakel, State University of New York, Binghamton, NY, USA
- 1500 **Coffee Break**
- 1520 *Space-Domain Analysis for Highly Discretized Passive Planar Structures on Silicon*
S. Sattler and T. Felgentreff, Technische Universität München, Lehrstuhl für
Hochfrequenztechnik, München, Germany
P. Russer, Ferdinand-Braun-Institut für Höchstfrequenztechnik, Berlin, Germany
- 1540 *System Response of Semiconductor Panel to Linearly Graded Moving Rectangular Spot
Illumination and Its Use as Millimeter Wave Image Converter*
M. H. Rahnavard and A. Bakhtazad, Shiraz University, Shiraz, Iran
- 1600 *Crosstalk Reduction in Coupled Interconnects With Ground Plane Slots*
S. Luo and V. K. Tripathi, Oregon State University, Corvallis, OR, USA
- 1620 *Contiguous-Band Output MultipleXers (COMUX): An Optimal Design*
G. Tanne and S. Toutain, Laboratoire D'Electronique et Systèmes de
Télécommunications - URA CNRS, Brest, France
J. F. Favennec, E.N.I. B., Laboratoire R. E. S. O., Brest, France,
P. Jarry, E. N. S. R. B., Talence, France
C. Boschet, C. N. E. S., Toulouse, France

SESSION 2P8

Tuesday, July 13, PM 1320-1720, Keck Laboratories, Room 42

Organizer: R. Weigel

WAVE PROPAGATION IN PLANAR STRUCTURES

Co-Chairpersons: R. Weigel, Technische Universität München, Germany, and
R. D. Nevels, Texas A&M University, College Station, TX, USA

- 1320 *Short-Pulse-Induced Wave Phenomena in Structurally Dispersive Layered Media*
L. B. Felsen, Polytechnic University, Brooklyn, NY, USA
- 1340 *Integral Equation Techniques for Three-Dimensional Microstrip Structures*
J. R. Mosig, Laboratoire d'Electromagnétisme et d'Acoustique, Ecole Polytechnique
Fédérale de Lausanne, Lausanne, Switzerland
- 1400 *Rigorous Analysis of Coupling Between Microstrip and Coplanar Waveguides*
H. Jin and R. Vahldieck, LLiMiC, University of Victoria, Victoria, B.C., Canada
P. Russer, Ferdinand-Braun-Institut für Höchstfrequenztechnik, Berlin, Germany
- 1420 *Efficient Modeling of Coplanar Waveguide Structures Including Metallization Thickness*
F. Alessandri, M. Mongiardo, and R. Sorrentino, Istituto di Elettronica Università di
Perugia, Perugia, Italy
- 1440 *General Properties of Dominant Leaky Modes on Microstrip Lines With Uniaxial Substrates*
D. Nghiem, J. T. Williams, and D. R. Jackson, Applied Electromagnetics Laboratory,
University of Houston, Houston, TX, USA
A. A. Oliner, Weber Research Institute, Polytechnic University, Brooklyn, NY, USA
- 1500 **Coffee Break**
- 1520 *Efficient Analysis of Planar Microwave Structures by FDTD Diakoptics and Parameter
Estimation*
B. Houshmand, T. W. Huang, and T. Itoh, University of California, Los Angeles, CA,
USA
- 1540 *Theoretical and Experimental Investigations on Multiple Stacked FSS's Embedded in
Multilayered Media*
V. Hansen and H. Aroudaki, Institut für Hochfrequenztechnik, Ruhr—Universität
Bochum, Germany
E. Kreysa and H. P. Gemünd, Max-Planck-Institut für Radioastronomie, Bonn,
Germany
- 1600 *The Influence of Finite-Size Apertures on the Radiation Patterns of Slot-Excited Planar Leaky-
Wave Antennas*
H. Ostner, E. Schmidhammer, and J. Dettlensen, Technische Universität München,
München, Germany
D. R. Jackson, University of Houston, Houston, TX, USA
- 1620 *Time-Domain Simulation of Low-Reflection Broadband Coplanar Waveguide Tapers and
Circular Bends*
B. Isele, W. Thomann, F. Stöckeler, and R. Weigel, Technische Universität München,
München, Germany
P. Russer, Ferdinand-Braun-Institut für Höchstfrequenztechnik, Berlin, Germany
- 1640 *Mode Identification and New Aspects Regarding the Simulation of Hybrid-Mode Multistrip
Interconnects*
R. H. Jansen and M. Engels, Duisburg University, Duisburg, Germany
- 1700 *The Method of Lines for Open Waveguide Structures*
R. Pregla, Fern Universität, Hagen, Germany

SESSION 2P9

Tuesday, July 13, PM 1340-1620, Beckman Laboratories, Room 24

Organizer: Q.-H. Liu

ELECTROMAGNETIC SUBSURFACE SENSING II

Co-Chairpersons: Q.-H. Liu, Schlumberger-Doll Research, Ridgefield, CT, USA, and
W. Chew, University of Illinois, Urbana, IL, USA

- 1340 *Image Resolution Issues in Subsurface Radiowave Tomography*
L. G. Stolarczyk, Rimtech, Inc./Stolar, Inc., Raton, NM, USA
- 1400 *Cross-Borehole Electromagnetic Induction for Reservoir Characterization and Monitoring*
M. J. Wilt, Lawrence Livermore National Laboratory, Livermore, CA, USA
A. Becker and H. F. Morrison, University of California, Berkeley, CA, USA
D. Alumbaugh, Lawrence Berkeley Laboratory, Berkeley, CA, USA
- 1420 *Electromagnetic Sounding with MHD Generators*
W. D. Jackson, HMJ Corporation, Kensington, MD, USA
C. D. Maxwell, STD Corporation, Arcadia, CA, USA
M. Zhdanov, Colorado School of Mines, Golden, CO, USA
V. A. Zeigarnick, Institute for High Temperatures, Moscow, Russia
G. Keller, Consultant, Golden, CO, USA
- 1440 *Effects of Asymmetric Borehole and Invasion on MWD Resistivity Measurements in Drilling Horizontal Wells*
J.-Q. Wu, M. M. Wisler, and J. F. Towle, Develco, Inc., Houston, TX, USA
- 1500 **Coffee Break**
- 1520 *Interpolation Based Microwave Tomography for Subsurface Imaging*
P. Chaturvedi and R. G. Plumb, Radar Systems and Remote Sensing Laboratory,
University of Kansas, Lawrence, KS, USA
- 1540 *A Numerical Modeling for the Response of Dual Lateral Logging Tool in a Complex Environment*
Z. Nie and S. Chen, Chengdu Institute of Radio Engineering, Sichuan, PRC
D. Lu and Z. Zheng, China Ocean Oil Logging Corp., Beijing, PRC
- 1600 *Inverse Magnetotelluric Problem at Horizontal Propagation of Exiting Waves*
E. Khruslov and D. Shepelsky, Institute for Low Temperature Physics and Engineering,
Kharkiv, Ukraine
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SESSION 3A1

Wednesday, July 14, AM 0820-1200, Beckman Institute Auditorium
Organizer: W.-M. Boerner

RADAR POLARIMETRY: METROLOGY

Co-Chairpersons: W. Wiesbeck, Institut für Höchstfrequenztechnik, Universität Karlsruhe, Germany, and
Y. M. M. Antar, Royal Military College of Canada, Kingston, Ontario, Canada

- 0820 *Extension of the Polarization Scattering Matrix Concept to Antennas as Scatterers and Radiators*
E. Heidrich and W. Wiesbeck, Institut für Höchstfrequenztechnik, Universität Karlsruhe, Germany
- 0840 *Polarimetric Measurements and Remote Sensing of Snow and Melting Hydrometeors at the Ku- and X-Bands*
Y. M. M. Antar, Royal Military College of Canada, Kingston, Ontario, Canada
- 0900 *Comparison of Radar and Lidar Scattering Matrix Measurements*
H. Mott, W.-M. Boerner, R. M. Lempkowski, and Y. Yamaguchi, University of Illinois, Chicago, IL, USA
- 0920 *Classification of Simple Vegetation Types Using POLSAR Image Data*
A. Freeman, JPL, California Institute of Technology, Pasadena, CA, USA
- 0940 *Power Lines: Radar Measurements and Detection Algorithm for Polarimetric SAR Images*
K. Sarabandi, L. Pierce, Y. Oh, and F. T. Ulaby, University of Michigan, Ann Arbor, Michigan, USA
- 1000 **Coffee Break**
- 1020 *Recent Advances From the European Microwave Signature Laboratory (EMSL)*
A. J. Sieber and G. Nesti, Institute for Remote Sensing Applications, JRC, Ispra, Italy
- 1040 *On the Fundamental Polarimetric Imaging by an FM-CW Radar*
T. Yamaguchi, T. Nishikawa, and M. Sengoku, Niigata University, Niigata, Japan
W.-M. Boerner, University of Illinois, Chicago IL, USA
H. J. Eom, Korea Advanced Institute of Science and Technology, Taejeon, So. Korea
- 1100 *Fully Polarimetric Measurements and Simulation Results of Clutter Models Using Holographic Synthetic Aperture Radar*
B. A. Williams and B. D. Krennek, Houston Advanced Research Center, Houston, TX, USA
- 1120 *Outdoor Full Polarimetric Wide-Band Measurement System and Its Calibration Procedure*
E. Pottier, IRESTE-Laboratoire S2HF, Nantes, France
- 1140 *The Measurements of Main Radar Characteristics*
V. A. Sarychev, A. I. Kozlov, and A. I. Logvin, MIIGA, Moscow, Russian Federation
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SESSION 3A2

Wednesday, July 14, AM 0820-1200, Baxter Lecture Hall

Organizer: K.-F. Lee

MICROSTRIP ANTENNAS AND STRUCTURES

Co-Chairpersons: K.-F. Lee, University of Toledo, Toledo, OH, USA, and
D. R. Jackson, University of Houston, Houston, TX, USA

- 0820 *Two Microstrip Arrays for Interferometric SAR Applications*
J. Huang, JPL, California Institute of Technology, Pasadena, CA, USA
- 0840 *Reduced Surface Wave Microstrip Antennas: Theory and Experiments*
D. R. Jackson, J. T. Williams, R. L. Smith, S. J. Buchheit, S. A. Long, and
S. Jiang, University of Houston, Houston, TX, USA
A. K. Bhattacharyya, University of Saskatchewan, Saskatoon, Canada
- 0900 *Applications of Circularly Polarized Printed Arrays Composed of Strip Dipoles and Slots*
K. Ito, Chiba University, Chiba, Japan
- 0920 *Analysis of Aperture-Coupled Coplanar Parasitic Subarrays*
K. M. Luk and T. M. Au, City Polytechnic of Hong Kong, Hong Kong
- 0940 *Techniques in the Design of Low Cost Multi-Function Antennas*
J. R. James and A. Henderson, Royal Military College of Science, Shrivenham, Swindon,
Wilts, UK
- 1000 **Coffee Break**
- 1020 *A Crank-Type Antenna*
H. Nakano, Hosei University, Tokyo, Japan
K. Hirose, Shonan Institute of Technology, Kanagawa, Japan
- 1040 *Complex Image Technique for Vertical Antennas Penetrating a Dielectric Half-Space*
R. M. Shubair and Y. L. Chow, University of Waterloo, Waterloo, Ontario, Canada
- 1100 *Recent Activities in Printed Antennas at LeRC*
R. Q. Lee and R. N. Simons, NASA Lewis Research Center, Cleveland, OH, USA
- 1120 *Spectral Domain Analysis of Multiple-Layer Multiple-Patch Microstrip Antennas*
W. Chen and K.-F. Lee, University of Toledo, Toledo, OH, USA
- 1140 *Enhancing Finite-Difference Time-Domain Analysis for Electromagnetic Problems Using
Signal Processing Techniques*
J. Litva and J. Chen, McMaster University, Hamilton, Ontario, Canada

SESSION 3A3

Wednesday, July 14, AM 0840-1140, Steele Laboratory, Room 102
Organizer: Ch. Hafner

**GENERALIZED MULTIPOLE TECHNIQUES—
COMPARISONS AND COMBINATIONS WITH OTHER METHODS**

Co-Chairpersons: Ch. Hafner, Swiss Federal Institute of Technology, Zurich, Switzerland, and
Y. Leviatan, Technion-Israel Institute of Technology, Haifa, Israel

- 0840 *A Comparison of the Generalized Multipole Technique With the Method of Moments*
Ch. Hafner and G. Klaus, Swiss Federal Institute of Technology, Zurich, Switzerland
- 0900 *An Analytical Comparison of the Conditioning of Matrices Arising in Multiple Multipole and
Method of Moments Formulations*
R. J. Pogorzelski, General Research Corporation, Santa Barbara, CA, USA
- 0920 *Comparison of Different GMT Based Approaches to Calculate the Field Distribution in
Rectangular Cavities*
J. Froehlich, G. Klaus, and J. Zheng, Swiss Federal Institute of Technology, Zurich,
Switzerland
- 0940 *Analysis of Electromagnetic Scattering Using a Current-Model Method*
Y. Leviatan, Technion-Israel Institute of Technology, Haifa, Israel
- 1000 **Coffee Break**
- 1020 *Implementation of Rooftop Functions in the MMP Code*
Ch. Hafner, Swiss Federal Institute of Technology, Zurich, Switzerland
X. Shen, Syracuse University, Syracuse, NY, USA
- 1040 *The Yasuura Method for Calculating 3-D Scattering Problems by Perfectly Conducting Objects*
H. Ikuno, M. Nishimoto, and M. Gondoh, Kumamoto University, Kumamoto, Japan
- 1100 *Modified Reflective Symmetries for Improving the Efficiency of the MMP-Codes*
F. Bomholt, Oerlikon-Contraves AG, Zurich, Switzerland
L. Bomholt, IMHEF, Swiss Federal Institute of Technology, Lausanne, Switzerland
- 1120 *On the Use of SVD-Improved Point Matching in the Current-Model Method*
A. Boag, Y. Leviatan, and A. Boag, Technion-Israel Institute of Technology, Haifa, Israel
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SESSION 3A4

Wednesday, July 14, AM 0820-1200, Downs Laboratory, Room 107

Organizers: A. Ishimaru, L. Tsang, and K. O'Neill

SURFACE AND VOLUME SCATTERING: ROUGH SURFACE SCATTERING

Co-Chairpersons: L. Tsang and Y. Kuga, University of Washington, Seattle, WA, USA

- 0820 *Quasi-Slope Expansion in Rough-Surface Scattering Theory*
V. I. Tatarskii, NOAA/ERL/WPL and University of Colorado, Boulder, CO, USA
- 0840 *New Features in the Scattering of Light From Random Surfaces That Are Periodic on Average*
A. D. Arsenieva and A. A. Maradudin, University of California, Irvine, CA, USA
A. R. McGurn, Western Michigan University, Kalamazoo, MI, USA
- 0900 *An Area Segmentation Approach to the Iterative Solution of Rough Surface Scattering Problems*
G. S. Brown, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA
- 0920 *A New Formulation of Electromagnetic Scattering From Rough Dielectric Interfaces*
J. A. DeSanto, Colorado School of Mines, Golden, CO, USA
- 0940 *High Slope Second-Order Theory of Scattering From Very Rough Surfaces*
A. Ishimaru and P. Phu, University of Washington, Seattle, WA, USA
J. S. Chen, Lockheed Palo Alto Research Laboratory, Sunnyvale, CA, USA
- 1000 **Coffee Break**
- 1020 *Numerical Studies of Surface Waves on Randomly Rough Surfaces*
E. I. Thorsos and P. A. Oakley, University of Washington, Seattle, WA, USA
- 1040 *Enhanced Backscattering From a Rough Dielectric Film on a Glass Substrate*
Z.-H. Gu and J. Q. Lu, Surface Optics Corporation, San Diego, CA, USA
R. E. Luna and E. R. Mendez, Centro de Investigación Científica de Educación Superior de Ensenada, Ensenada, B.C., Mexico
- 1100 *Monte Carlo Simulations of Large-Scale Random Rough Surface Scattering Based on a Sparse Matrix Iterative Approach*
L. Tsang, C. H. Chan, L. Li, K. Pak, and H. Sangani, University of Washington, Seattle, WA, USA
- 1120 *Copolarized and Crosspolarized Enhanced Backscattering From Two-Dimensional Very Rough Surfaces at Millimeter-Wave Frequencies*
P. Phu, A. Ishimaru, Y. Kuga, and B. Kitichotpanit, University of Washington, Seattle, WA, USA
- 1140 *A Two-Scale Model for Scattering and Emission From Randomly Rough Sea Surface With Foam Scatterers*
Y.-Q. Jin and X. Huang, Fudan University, Department of Electronic Engineering, Shanghai, PRC

SESSION 3A5

Wednesday, July 14, AM 0820-1200, Downs Laboratory, Room 103

ELECTROMAGNETIC INTERACTIONS WITH SPECIAL MEDIA II

Co-Chairpersons: R. H. Lang, George Washington University, Washington, DC, USA, and
Y. Kuga, University of Washington, Seattle, WA, USA

- 0820 *On the Singularity of the Electromagnetic Dyadic Green's Function for Planar Multi-Layered Anisotropic Uniaxial Material Media*
S. Barkeshli, Space Systems/Loral, Palo Alto, CA USA
- 0840 *Nonequilibrium High-Frequency Discharge in a Converging Cylindrical Wave*
A. V. Kim, Institute of Applied Physics, Russian Academy of Sciences, Nizhnij Novgorod, Russia
A. S. Petrosyan, Space Research Institute, Russian Academy of Sciences, Moscow, Russia
- 0900 *Physical Aspects of the Markovian Approximation in the Problem of Wave Propagation in Random Media*
A. G. Borovoy, Institute of Atmospheric Optics, S. B. Russian Academy of Sciences, Tomsk, Russia
- 0920 *Backscattering Enhancement by Finite Discrete Media*
A. G. Borovoy, N. I. Vagin, and G. A. Selivanova, Institute of Atmospheric Optics, S. B. Russian Academy of Sciences, Tomsk, Russia
- 0940 *Wave Transition Through a Fat Fractal Slab*
V. V. Konotop, Universidade de Madeira, Colegio dos Jesuitas, Funchal, Portugal
S. A. Bulgakov, Institute of Radio Astronomy, Kharkov, Ukraine
- 1000 **Coffee Break**
- 1020 *Electromagnetic Energy Dissipation of Plane Wave Pulses in a Causal, Dispersive Dielectric*
P. D. Smith and K. E. Oughstun, University of Vermont, Burlington, VT, USA
- 1040 *Pair Distribution Functions and Attenuation Rates for Dense Discrete Random Media With Sticky Particles*
K. H. Ding, New Mexico State University, Las Cruces, NM, USA
L. Tsang and L. Zurk, University of Washington, Seattle, WA, USA
- 1100 *Infrared Optical Properties of Granular Ferromagnetic Metals: Theoretical and Experimental Study*
M. Gadenne, J. Plon, and P. Gadenne, Laboratoire d'Optique des Solides, Université Pierre et Marie Curie, Paris, France
C. Julien, Laboratoire de Physique des Solides, Université Pierre et Marie Curie, Paris, France
P. Sheng, Exxon Research and Engineering Co., Annandale, NJ, USA
- 1120 *Magnetoresonance Damping in Random Reentrant Metal Alloys at $h\nu/kT > 1$*
A. A. Vertiy, A. V. Golik, and S. I. Tarapov, Institute of Radiophysics and Electronics, Academy of Sciences of the Ukraine, Kharkov, Ukraine
- 1140 *Surface Impedance Condition for PEC Object With a Biisotropic (Nonreciprocal) Coating*
D. Cheng, Y. Zhao, W. Lin, University of Electronic Science and Technology, Chengdu, PRC

SESSION 3A6

Wednesday, July 14, AM 0800-1200, Downs Laboratory, Room 11

SPECIAL SESSION IN HONOR OF PROFESSOR CHARLES PAPAS

Co-Chairpersons: K. S. H. Lee, Kaman Sciences Corporation, Santa Monica, CA, USA, and
C. Elachi, JPL, California Institute of Technology, Pasadena, CA, USA

- 0800 *Infrared Measurements of Electromagnetic Fields*
J. D. Norgard, R. M. Sega, and M. G. Harrison, University of Colorado, Colorado Springs, CO, USA, and Phillips Laboratory, Kirtland AFB, NM, USA
- 0820 *On Realizability Conditions for a Linear Passive Isotropic Medium*
K. M. Mitzner, Northrop Corporation, Pico Rivera, CA, USA
- 0840 *Implications of the New Equation of Motion for Charged Particles in Classical Electrodynamics*
C. T. C. Mo, Logicon RDA, Los Angeles, CA, USA
- 0900 *Electromagnetic Coupling and Scattering by Impulse and Step-Function Waveforms*
K. S. H. Lee and F. C. Yang, Kaman Sciences Corporation, Santa Monica, CA, USA
- 0920 *Analytical Evaluation of a Surface Integral Expressing the Coupling Between Interior and Exterior Volumes in a FE-IE Approach*
C. Zuffada, T. Cwik, and V. Jamnejad, JPL, California Institute of Technology, Pasadena, CA, USA
- 0940 *Advances in Spaceborne Radar Remote Sensing*
C. Elachi, JPL, California Institute of Technology, Pasadena, CA, USA
- 1000 **Coffee Break**
- 1020 *Eddy Currents and Impedance Corrections at Sharp Corners*
L. K. Warne, Sandia National Laboratories, Albuquerque, NM, USA
- 1040 *Near-Field Localization in Three Dimensions*
R. J. Pogorzelski, General Research Corporation, Santa Barbara, CA, USA
- 1100 *Static Polarizability and Quasistatic Scattering for a Lossless Dielectric Lamina of Constant Section With Electric Field Normal to the Axis*
K. M. Mitzner, Northrop Corporation, Pico Rivera, CA, USA
- 1120 *Vector and Scalar Potentials Away From Sources and Gauge Invariance in Quantum Electrodynamics*
C. E. Baum, Phillips Laboratory/WSR, Kirtland AFB, NM, USA
- 1140 *Detection of Traveling Ionosphere Disturbances Induced by Atmospheric Gravity Waves Using the Global Positioning System*
S. Bassiri, Sharif University of Technology, Tehran, Iran
G. A. Hajj, JPL, California Institute of Technology, Pasadena, CA, USA

SESSION 3A7

Wednesday, July 14, AM 0840-1200, Lauritsen Laboratory, Room 269

DEVICES AND CIRCUITS II

Co-Chairpersons: T. Itoh, University of California, Los Angeles, CA, USA, and
D. R. Jackson, University of Houston, Houston, TX, USA

- 0840 *Field-Circuit Combined Approach for Permanent Magnet Motors Analysis*
M. A. Rahman and P. Zhou, Memorial University of Newfoundland, St. John's,
Newfoundland, Canada
- 0900 *Modulation Codes for FDDI-TTPMD (Twisted-Pair Physical Media Dependent)*
R.-F. Chiu and D. Dove, Hewlett Packard Company, Palo Alto, CA, USA
- 0920 *The Study of a Double-Gate FET on AsGa Using Green's Function Method*
L. K. Mounia and B. Mohamed, University Abdelmalek Essaadi, Tetouan, Morocco
- 0940 *Using an Integral Coil to Drive a Two-Axis Gyroscope*
W. S. Wu, Chung Shan Institute of Science and Technology, Taiwan, ROC
- 1000 **Coffee Break**
- 1020 *Harmonic Analysis of Discrete and Continuous AC Supply Driving Frequency Sensitive Loads*
K. R. Kini, D. Ramesh, K. Sheelamangalam, and Dipankardan, SAMEER-Centre for
Electromagnetics, Madras, India
- 1040 *Calculation of Equivalent Self and Mutual $R(v)$, $L(v)$, $G(v)$, $C(v)$ Matrix Elements for
Dispersive Dissipative Multiconductor Interconnects*
V. Tripathi and N. Orhanovic, Oregon State University, Corvallis, OR, USA
- 1100 *Analysis and Design of Millimeter Wave Integrated PIN Series Switches*
D. Li, R. Xu, and L. Xue, Institute of Applied Physics, University of Electronic Science
and Technology of China, Chengdu, PRC
- 1120 *Magnetron Extragrand Oscillations, The Problem and Its Solution*
G. Ya. Levin and A. Ya. Usikov, Institute of Radiophysics and Electronics, Academy of
Sciences of the Ukraine, Kharkov, Ukraine
- 1140 *Russian Surface Wave Magnetrons With Lens Optics*
G. Ya. Levin, A. Ya. Usikov, and S. N. Terechin, Institute of Radiophysics and
Electronics, Academy of Sciences of the Ukraine, Kharkov, Ukraine
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SESSION 3A8

Wednesday, July 14, AM 0840-1140, Keck Laboratories, Room 42

Organizer: M. Guglielmi

FULL-WAVE ELECTROMAGNETIC SIMULATION OF WAVEGUIDE DISCONTINUITIES

Co-Chairpersons: M. Guglielmi, ESA/ESTEC, Noordwijk, The Netherlands, and
I. C. Peden, University of Washington, Seattle, WA, USA

- 0840 *Three Dimensional Finite Element Method Applied to Analyze Microwave Discontinuities*
V. Madrangeas, M. Aubourg, S. Verdeyme, and P. Guillon, I.R.C.O.M.-U.R.A. 356
C.N.R.S., University of Limoges, Limoges, France
- 0900 *Analysis of Arbitrarily Shaped H-Plane or E-Plane Discontinuities in Rectangular Waveguides
By an Efficient Full-Wave Boundary Contour Mode-Matching-Method*
F. Arndt and J. M. Reiter, University of Bremen, Bremen, Germany
- 0920 *Full-Wave Analysis of Various Planar Discontinuities for Application in Monolithic Integrated
Microwave Circuits*
I. Wolff, Duisburg University, Duisburg, FRG
- 0940 *Field-Theory Analysis of Planar Waveguide Interconnects*
R. Vahldieck, University of Victoria, Victoria, B.C., Canada, and
Ferdinand-Braun-Institut für Hochfrequenztechnik, Berlin, Germany
H. Jing, University of Victoria, Victoria, B.C., Canada
P. Russer, Ferdinand-Braun-Institut für Hochfrequenztechnik, Berlin, Germany
- 1000 **Coffee Break**
- 1020 *Recent Advances in the Fullwave Simulation of Waveguide Components by Mode-Matching
Technique*
F. Alessandri, M. Mongiardo, and R. Sorrentino, Istituto di Elettronica, Università di
Perugia, Perugia, Italy
- 1040 *Full Wave Network Analysis of Waveguide Discontinuities*
M. Guglielmi, ESA/ESTEC, Noordwijk, The Netherlands
- 1100 *A Study of Micromachined Transmission Lines and Circuits*
L. P. B. Katehi, University of Michigan, Ann Arbor, MI, USA
- 1120 *Microstrip Elements and Applications: A Progress Report*
N. G. Alexopoulos, University of California, Los Angeles, CA, USA

SESSION 3A9

Wednesday, July 14, AM 0820-1200, Beckman Laboratories, Room 24

Organizer: C. Luther

SEA ICE ELECTROMAGNETICS I

Co-Chairpersons: C. Luther and A. K. Jordan, Naval Research Laboratory, Washington, DC, USA

- 0820 *Electromagnetic Study of Arctic Sea Ice*
R. G. Onstott, Center for Earth Sciences, Environmental Research Institute of Michigan, Ann Arbor, MI, USA
- 0840 *An In-Depth Study of the Scattering Mechanisms Involved With Sea Ice*
J. Bredow, R. Porco, and A. Fung, Wave Scattering Research Center, University of Texas, Arlington, TX, USA
- 0900 *Passive Microwave Study of Thin Sea Ice From The Arctic Lead Experiment 1992*
T. C. Grenfell, University of Washington, Seattle, WA, USA
D. K. Perovich, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH, USA
- 0920 *Polarimetric Backscattering From Sea Ice*
S. V. Nghiem, R. Kwok, and S. H. Yueh, JPL, California Institute of Technology, Pasadena, CA, USA
- 0940 *Modeling the Temporal Evolution of L-Band Polarimetric SAR Observations of Growing Sea Ice in Arctic Leads*
D. P. Winebrenner, T. C. Grenfell, and M. R. Wensnahan, University of Washington, Seattle, WA, USA
- 1000 **Coffee Break**
- 1020 *Observation of Pressure Ridges in SAR Images of Sea Ice: Scattering Theory and Comparison With Observations*
J. F. Vesecky and J. M. Daida, University of Michigan, Ann Arbor, MI, USA
R. A. Shuchman and R. H. Onstott, Environmental Research Institute of Michigan, Ann Arbor, MI, USA
J. C. Camiso, NASA Goddard Space Flight Center, Greenbelt, MD, USA
- 1040 *On Evaluating the Accuracy of SAR Sea-Ice Classification Using Multifrequency Polarimetric AIRSAR Data*
M. R. Drinkwater and E. Rignot, JPL, California Institute of Technology, Pasadena, CA, USA
- 1100 *Microwave Response to Stress in Sea Ice—Initial Field Tests*
M. D. Coon, D. C. Echert, Williamson & Associates, Inc., Seattle, WA, USA
R. G. Onstott, Environmental Research Institute of Michigan, Ann Arbor, MI, USA
- 1120 *Radar Backscatter From Snow-Covered Saline Ice Under Controlled Conditions*
L. Lockhart, S. Beaven, and S. Gogineni, Radar Systems and Remote Sensing Laboratory, University of Kansas Center for Research, Inc., Lawrence, KS, USA
K. Jezek, Ohio State University, Columbus, OH, USA
T. Gow, U. S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH, USA
- 1140 *Bounds on the Complex Permittivity of Sea Ice*
K. Golden, University of Utah, Salt Lake City, UT, USA
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SESSION 3P1

Wednesday, July 14, PM 1320-1700, Beckman Institute Auditorium

Organizer: W.-M. Boerner

RADAR POLARIMETRY: IMAGING

Co-Chairpersons: P. Dubois, JPL, California Institute of Technology, Pasadena, CA, USA, and
Y. Yamaguchi, University of Niigata, Ikarashi-Campus, Niigata, Japan

- 1320 *Application of Cloude's Target Decomposition Theorem to Polarimetric Imaging Radar Data*
J. J. van Zyl, JPL, California Institute of Technology, Pasadena, CA, USA
- 1340 *Optimal Polarimetric Processing for Enhanced Target Detection*
M. C. Burl, W. W. Irving, and L. M. Novak, Lincoln Laboratory, MIT, Lexington, MA, USA
- 1400 *Direction Angle Sensitivity of Agricultural Field Backscatter With AIRSAR Data*
P. C. Dubois, E. Rignot, J. J. van Zyl, JPL, California Institute of Technology, Pasadena, CA, USA
- 1420 *Methods of Feature Extraction in Polarimetric Radar Imaging Using Coherent and Incoherent Matrix Decompositions*
E. Krogager, Danish Defense Research Establishment, Copenhagen, Denmark
- 1440 *On Radar Polarization Target Decomposition Theorems With Application to Supervised and Unsupervised Classification of Full Polarimetric SAR Data*
E. Pottier, Laboratoire S2HF-IRESTE, Nantes, France
- 1500 **Coffee Break**
- 1520 *Recent Advances in Vector Diffraction Imaging: Incorporation of Complete Polarization Information*
K. J. Langenberg, M. Brandfass, T. Gurke, and H. Rass, University of Kassel, Germany
- 1540 *Dual Polarization Radar/SAR Two-Channel Imagery and Its Polarimetric Contrast Enhancement*
Y. Yamaguchi, M. Sengoku, and K. Fujimoto, University of Niigata, Ikarashi-Campus, Niigata, Japan
M. Tanaka, University of Oita, Kyushu, Japan
H.-J. Eom, KAIST-EE Wave Scattering Laboratory, Korea Advanced Institute of Science and Technology, Taejeon, South Korea
E. Lüneburg, DLR-NE-HF Electromagnetic Theory Group, DLR Oberpfaffenhofen, Wessling, FRG
P. Dubois and J. J. van Zyl, JPL, California Institute of Technology, Pasadena, CA, USA
W.-M. Boerner, UIC-EECS Communications and Sensing Laboratory, Chicago, IL, USA
- 1600 *Classification of SAR Images Using a Fractal Approach*
H. T. Ewe, W. C. Au, R. T. Shin, and J. A. Kong, MIT, Cambridge, MA, USA
- 1620 *An Inversion Algorithm for Wide Band SAR Data*
L.-E. Andersson, A. Gustavsson, and H. Hellsten, National Defense Research Establishment, Linköping, Sweden
- 1640 *Development of the Polarimetric Contrast Enhancement Optimization (OPEC-FILTER) and Its Application to Sea Surface Scatter in POL-SAR Image Analysis*
A. C. Segal, M. Walther, and W.-M. Boerner, UIC-EECS Communications and Sensing Laboratory, University of Illinois, Chicago, IL, USA

SESSION 3P2

Wednesday, July 14, PM 1320–1640, Baxter Lecture Hall
Organizer: S. Sali

ELECTROMAGNETIC INTERFERENCE AND ANTENNAS

Co-Chairpersons: S. Sali, University of Newcastle upon Tyne, UK, and
V. Jamnejad, JPL, California Institute of Technology, Pasadena, CA, USA

- 1320 *Transient Finite Element Analysis of Axisymmetrical Antennas*
H. O. Ali and G. Costache, University of Ottawa, Ontario, Canada
- 1340 *Application of E. M. Topology to Generalized Transmission Line Networks*
Ph. Besnier, University of Lille, Villeneuve d'Ascq, France, and ONERA, Meudon, France
P. Degauque, University of Lille, Villeneuve d'Ascq, France
- 1400 *Mobile Telecommunication in Road Tunnels: Theoretical and Experimental Characterization of the Transmission Channel*
M. Liénard, S. Baranowski, and P. Mariage, University of Lille, Villeneuve d'Ascq, France
- 1420 *An Approach to Determine Reflection and Crosstalk — Problems on Printed Circuit Boards*
W. John, Siemens Nixdorf Informationssysteme AG, Paderborn, Germany
J. Schrage, University of Paderborn, Paderborn, Germany
- 1440 *Transmission Line Model for a Plane Screen Against an Arbitrary Polarized and Incident Plane Wave*
F. Han, Northern Jiaotong University, Beijing, PRC
- 1500 **Coffee Break**
- 1520 *Response of Coaxial Cables With Braided Shields to External Antenna Fields*
S. Sali, University of Newcastle upon Tyne, UK
- 1540 *Experimental and Theoretical Investigations of Electromagnetic Coupling Between Coaxial Cables With Imperfect Shields*
S. Sali, University of Newcastle upon Tyne, UK
- 1600 *Response of Discontinuous Microstrip Interconnects Illuminated by Antenna Fields*
S. Sali, University of Newcastle upon Tyne, UK
- 1620 *A Workbench for Printed Circuit Board Design Under EMC Constraints*
W. John, Siemens Nixdorf Informationssysteme AG, Paderborn, Germany
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SESSION 3P3

Wednesday, July 14, PM 1320-1620, Steele Laboratory, Room 102
Organizer: W. C. Chew

EFFICIENT METHODS TO SOLVE WAVE-SCATTERING AND PROPAGATION PROBLEMS

Co-Chairpersons: W. C. Chew, University of Illinois, Urbana, IL, USA, and
A. Sezginer, Schlumberger-Doll Research, Ridgefield, CT, USA

- 1320 *Solution of 2.5-Dimensional Problems Using the Lanczos Decomposition*
A. Allers, University of Delaware, Newark, DE, USA
A. Sezginer and V. L. Druskin, Schlumberger-Doll Research, Ridgefield, CT, USA
- 1340 *Efficient Solution Techniques for Integral Equation Methods in Electromagnetic Modeling*
D.-S. Wang, McDonnell Douglas Aerospace, St. Louis, MO, USA
- 1400 *NEPAL—A Fast Algorithm for Solving Volume Integral Equation*
W. C. Chew, C. C. Lu, and J. H. Lin, University of Illinois, Urbana, IL, USA
- 1420 *Superconvergent and Hierarchical Methods in 3D Finite Elements*
J. R. Lovell, Schlumberger-Doll Research, Ridgefield, CT, USA
- 1440 *The Use of Wavelet-Like Transforms for Expediting the Solution of Surface Integral Equations for Metallic Waveguide Problems*
R. L. Wagner, G. P. Otto, and W. C. Chew, University of Illinois, Urbana, IL, USA
- 1500 **Coffee Break**
- 1520 *Fast Computational Technique for Field Evaluations Inside Rectangular Enclosures*
S. Hashemi-Yeganeh, Arizona State University, Tempe, AZ, USA
- 1540 *An Efficient CG-FFHT Method for the Solution of EM Field*
Q.-H. Liu, Schlumberger-Doll Research, Ridgefield, CT, USA
W. C. Chew, University of Illinois, Urbana, IL, USA
- 1600 *Lanczos Solver of Large Scale Electrodynamical Problems of Inhomogeneous Conductive Media in the Time and Frequency Domains*
V. Druskin, Schlumberger-Doll Research, Ridgefield, CT, USA
L. Knizhnerman, Central Geophysical Expedition, Moscow, Russia

SESSION 3P4

Wednesay, July 14, PM 1320-1640, Downs Laboratory, Room 107

Organizers: A. Ishimaru, L. Tsang, and K. O'Neill

DENSE MEDIA AND ROUGH SURFACE SCATTERING

Co-Chairpersons: A. Ishimaru, University of Washington, Seattle, WA, USA, and
G. Brown, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA

- 1320 *Monte-Carlo Simulation of the Multiple Scattering Effect of Many Dielectric Spheres Using the Recursive Aggregate T Matrix Algorithm*
C. C. Lu, Y. M. Wang, and W. C. Chew, University of Illinois, Urbana, IL, USA
L. Tsang, University of Washington, Seattle, WA, USA
- 1340 *Construction and Measurements of Robotically Fabricated Dense Media Targets*
R. Porco, J. Bredow, and S. Nadimi, University of Texas, Arlington, TX, USA
- 1400 *Coherent Reflectivity and Bistatic Cross Section of a Dense Strongly Scattering Medium*
Y. Kuga, B. Kitichotpanit, A. Ishimaru, and C. Clayton, University of Washington, Seattle, WA, USA
- 1420 *Numerical Analysis of the Effective Dielectric Constant of Random Media Composed of Particles Embedded in a Background Homogeneous Medium*
M. Tateiba and T. Oe, Kyusyu University, Fukuoka, Japan
Y. Nanbu, Sasebo College of Technology, Sasebo, Japan
- 1440 *Beam Simulation Applied to Rough Surface Scattering at Low Grazing Scattering Angles*
H. D. Ngo and C. L. Rino, Vista Research, Inc., Mountain View, CA, USA
- 1500 **Coffee Break**
- 1520 *Numerical Simulation of Narrow Pulses From Simulated Ocean Surface Structures*
C. L. Rino and H. D. Ngo, Vista Research, Inc., Mountain View, CA, USA
- 1540 *Anderson Localization of Electromagnetic Fields by Rough Surfaces*
D. Maystre, Laboratoire d'Optique Electromagnétique, Marseilles, France
- 1600 *Anderson Localization of Electromagnetic Surface Waves by Rough Surfaces*
M. Saillard, Laboratoire d'Optique Electromagnétique, Marseilles, France
- 1620 *Enhanced Backscattering From a Random Medium of Rayleigh Scatterers: Exact Solution and Analysis of the Peak Line Shape*
V. D. Ozhin, Nuclear Safety Institute, Russian Academy of Sciences, Moscow, Russia
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SESSION 3P5

Wednesday, July 14, PM 1340-1640, Downs Laboratory, Room 103

BIANISOTROPIC AND CHIRAL MEDIA

Co-Chairpersons: I. Lindell, Helsinki University of Technology, Espoo, Finland, and
N. Engheta, University of Pennsylvania, Philadelphia, PA, USA

- 1340 *Properties of Chiral Media*
C. M. Krowne, Naval Research Laboratory Microwave Technology Branch, Electronics
Technology Division, Washington, DC, USA
- 1400 *Modelling of Helix-Loaded Chiral Radar Absorbing Layers*
C. R. Brewitt-Taylor, Defense Research Agency, Malvern, Worcester, UK
- 1420 *Plane Wave Propagation and Eigenfields in a Uniaxial Bianisotropic Medium*
A. J. Viitanen and I. V. Lindell, Helsinki University of Technology, Espoo, Finland
- 1440 *A Transfer Function Approach to Beam Propagation in Chiral Media*
P. P. Banerjee, University of Alabama, Huntsville, AL, USA
M. Lee, Syracuse University, Syracuse, NY, USA
M. R. Chatterjee, State University of New York, Binghamton, NY, USA
- 1500 **Coffee Break**
- 1520 *Characteristics of Surface and Spatial Electromagnetic Waves in Planar Integrated Pseudo
Chiral (Ω) Structures*
A. Toscano and L. Vegni, University of Rome "La Sapienza," Rome, Italy
- 1540 *Surface Wave Nodes on Open Chirowaveguides*
S. F. Mahmoud, Kuwait University, Safat, Kuwait
- 1600 *Multiplicative Noise Influence on Electromagnetic Perturbations and Helical Media Dynamics*
S. S. Moiseev, Space Research Institute of the Russian Academy of Sciences, Moscow,
Russia
- 1620 *About Some Resonance Effects in Nonlinear and Chiral Media*
N. S. Erokhin, Space Research Institute of the Russian Academy of Sciences, Moscow,
Russia

SESSION 3P6

Wednesday, July 14, PM 1320-1620, Downs Laboratory, Room 11

Organizers: Y. Leroy and S. Mizushina

MEDICAL APPLICATIONS

Co-Chairpersons: Y. Leroy, IEMN-UMR, CNRS Université des Sciences et Techniques, Villeneuve d'Ascq, France, and

S. Mizushina, Shizuoka University, Hamamatsu, Japan

- 1320 *Combined Inverse Reconstruction Algorithm for Highly Contrasted Biological Bodies in Microwave Tomography*
J. J. Mallorquí, A. Broquetas, A. Cardama, and L. Jofre, ETSETB, Universitat Politècnica de Catalunya, Barcelona, Spain
- 1340 *Multifrequency Microwave Radiometry of Sub-Superficial Thermal Structures: A Retrieval Evaluation*
F. Bardati and P. Tognolatti, Università di Roma "Tor Vergata," Roma, Italy
- 1400 *Retrieval of Temperature-Depth Profile in a Biological Structure From Multi-Frequency Microwave Radiometric Data*
S. Mizushina, M. Kinomura, H. Ohba, and T. Sugiura, Research Institute of Electronics, Shizuoka University, Hamamatsu, Japan
- 1420 *Capability of Microwave Radiometric Imaging to Identify Different Shapes of Thermal Structures*
B. Bocquet, R. A. Abdelmalek, J. C. Van de Velde, A. Mamouni, and Y. Leroy, DHS-IEMN-UMR CNRS, Université des Sciences et Technologies de Lille, Villeneuve D'Ascq, France
- 1440 *Interstitial Array Applicator Composed of Coaxial-Slot Antennas for Microwave Hyperthermia*
K. Ito, Chiba University, Chiba, Japan
- 1500 **Coffee Break**
- 1520 *Estimation of Temperature Distribution in Human Body Under Hyperthermia Treatment Using Blood Flow Rate Data From Spect Images*
J.-I. Matsuda and K. Kato, Nagaoka University of Technology, Niigata, Japan
- 1540 *Intracavity Hyperthermia and Radiation of Esophageal Cancer*
C. K. Chou, N. Vora, J. A. McDougall, K. W. Chan, C. Staud, and R. Pezner, City of Hope National Medical Center, Duarte, CA, USA
- 1600 *Antennas and Applicators for Microwave Hyperthermia Controlled by Microwave Radiometry*
M. Chive, L. Dubois, J. C. Camart, P. Y. Cresson, F. Morganti, C. Michel, F. Duhamel, D. Desprets, J. J. Fabre, and J. Pribetich, IEMN-UMR CNRS, Université des Sciences et Technologies de Lille, Villeneuve d'Ascq, France

SESSION 3P7

Wednesday, July 14, PM 1320-1640, Lauritsen Laboratory, Room 269

Organizer: J. W. Bredow

MICROWAVE/MILLIMETER WAVE INSTRUMENTS AND CALIBRATIONCo-Chairpersons: J. W. Bredow, University of Texas, Arlington, TX, USA, and
S. Gogineni, University of Kansas, Lawrence, KS, USA

- 1340 *On the Use of Conducting Cylinders as Reference Targets for Radar Cross-Section Measurements*
B. D. Jersak and J. W. Bredow, Wave Scattering Research Center, University of Texas, Arlington, TX, USA
A. J. Blanchard, Space Technology and Research Center, Houston Advanced Research Center, The Woodlands, TX, USA
- 1400 *A Portable L-band Polarimetric Radar*
T. Chuah and S. Gogineni, The University of Kansas Radar Systems and Remote Sensing Laboratory, Lawrence, KS, USA
- 1420 *FMCW Ground Probing Radar*
E. Jackson and J. Bredow, Wave Scattering Research Center, University of Texas, Arlington, TX, USA
- 1440 *A 75-110 GHz Millimeter-Wave Radiometer/Radar for Pollution Studies*
J. Bredow, A. K. Fung, S. Tjuatja, and P. Giradot, University of Texas, Arlington, TX, USA
- 1500 **Coffee Break**
- 1520 *Calibration of a Dual-Channel Radar Antenna System Using Point Targets to Estimate Gain and Cross-Talk Parameters*
S. Anders and N. Anders, Swedish Institute of Space Physics, Kiruna, Sweden
J. Vivekanandan, National Center for Atmospheric Research, Boulder, CO, USA
- 1540 *Polarimetric Calibration and Analysis of CCRS C/X-Band SAR Data*
M. Rey, Defense Research Establishment, Ottawa, Ontario, Canada
R. Touzi and C. Livingstone, Canada Centre for Remote Sensing, Energy, Mines, and Resources, Ottawa, Ontario, Canada
J. Ehrismann, Atlantis Scientific Systems Ltd., Ottawa, Ontario, Canada
- 1600 *ERS-1 and JERS-1 External Calibration Experiments*
M. Zink and P. Seifert, DLR, German Aerospace Research Establishment, Institute for Radio Frequency Technology, Oberpfaffenhofen, Germany
- 1620 *Calibration of Spaceborne Scatterometers Using the Amazon Tropical Rainforest*
D. G. Long and G. Skouson, Brigham Young University, Provo, UT, USA
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 SESSION 3P8

Wednesday, July 14, PM 1320-1700, Keck Laboratories, Room 42

MICROSTRIP AND COPLANAR LINES

 Co-Chairpersons: J. Huang, JPL, California Institute of Technology, Pasadena, CA, USA, and
 C. T. Tai, University of Michigan, Ann Arbor, MI, USA

- 1320 *Analysis of Microstrip Multiport Junctions Using Multimode Boundary Integral Method*
 Y. B. Gan, Defense Science Organisation, Singapore
 M. S. Leong and P. S. Kooi, National University of Singapore, Singapore
- 1340 *Theoretical and Experimental Investigation of Broadside-Coupled Suspended Microstrip Lines*
 M. Lyakoubi and P. Jarry, Laboratoire de Télécommunications de Bordeaux-France,
 Talence, France
- 1400 *Integral Equation Analysis of Coupled Microstrip Lines With Ferromagnetic Thin Film*
 Y. Yuan, Y. E. Yang, and J. A. Kong, Research Laboratory of Electronics, MIT,
 Cambridge, MA, USA
- 1420 *Time-Domain Analysis of Planar Microstrip Devices Using a Generalized Yee-Algorithm Based
 on Unstructured Grids*
 S. D. Gedney, University of Kentucky, Lexington, KY, USA
 F. Lansing, JPL, California Institute of Technology, Pasadena, CA, USA
- 1440 *Comparison of Possible Package Densities in Coplanar and Microstrip Circuits*
 T. Becks and I. Wolff, Duisburg University, Duisburg, Germany
- 1500 **Coffee Break**
- 1520 *The Design of Microwave Integrated Multistages Active Filters*
 E. El Hendaoui and P. Jarry, Laboratoire de Télécommunications, ENSERB, Talence,
 France
- 1540 *A Rigorous Technique for the Shielded MICs Higher Order Modes Elimination*
 M. Essaaidi, Tetouan, Morocco
- 1600 *Radiation From Planar Circuit Discontinuities by Discontinuity Isolation*
 K. Naishadham and T. W. Nuteson, Wright State University, Dayton, OH, USA
- 1620 *Analysis of Terminated Coplanar Strips*
 W. K. Ofofu and D. Mirshekar-Syahkal, University of Essex, Colchester, Essex, UK
- 1640 *A Field Theory Analysis of a Microstrip Circulator Using the Finite Element Method*
 E. A. F. Abdallah and D. A. M. Salem, Electronics Research Institute, National Research
 Centre, Cairo, Egypt
 M. E. Mostafa, Cairo University, Giza, Egypt
 A. A. N. Ahmed, Benha Company for Electronics Industries, Benha, Egypt
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SESSION 3P9

Wednesday, July 14, PM 1320-1700, Beckman Laboratories, Room 24

Organizer: A. K. Jordan

SEA ICE ELECTROMAGNETICS II

Co-Chairpersons: A. K. Jordan and C. Luther, Naval Research Laboratory, Washington, DC, USA

- 1320 *Inversion of Microwave Measurements to Reconstruct Sea Ice Parameters*
M. E. Veysoglu, P. Coutu, R. T. Shin, and J. A. Kong, MIT, Cambridge, MA, USA
A. K. Jordan, Naval Research Laboratory, Washington, DC, USA
- 1340 *Radiative Transfer Theory for Active Remote Sensing of Sea Ice*
P. Coutu, C. C. Hsu, R. T. Shin, and J. A. Kong, MIT, Cambridge, MA, USA
- 1400 *Classification of SSM/I Polar Sea Ice Data Using Neural Networks*
M. S. Dawson, A. K. Fung, and M. T. Manry, University of Texas, Arlington, TX, USA
- 1420 *Analysis of Backscattering From Arctic and Antarctic Sea Ice*
S. Tjuatja, A. K. Fung, and J. Bredow, University of Texas, Arlington, TX, USA
R. Hosseinmostafa and S. Gogineni, University of Kansas, Lawrence, KS, USA
V. Lytle, U.S. Army Cold Region Research Engineering Laboratory, Hanover, NH, USA
- 1440 *Retrieval of Ice Thickness From Polarimetric SAR Data*
R. Kwok, S. H. Yueh, S. V. Nghiem, and D. D. Huynh, JPL, California Institute of Technology, Pasadena, CA, USA
- 1500 **Coffee Break**
- 1520 *Studies of Greenland Using the SEASAT Scatterometer*
D. G. Long, Brigham Young University, Provo, UT, USA
M. Drinkwater, JPL, California Institute of Technology, Pasadena, CA, USA
- 1540 *Radar Backscattering From Snow Facies of the Greenland Ice Sheet: Results From the AIRSAR 1991 Campaign*
E. Rignot, J. J. van Zyl, M. R. Drinkwater, and Y. L. Lou, JPL, California Institute of Technology, Pasadena, CA, USA
K. Jezek, Ohio State University, Columbus, OH, USA
- 1600 *Effects of Centimeter-Scale Density Layering on C- and X-Band Brightness Temperatures of Antarctic Firn*
R. D. West, L. Tsang, and D. P. Winebrenner, University of Washington, Seattle, WA, USA
H. Rott, Institut für Meteorologie und Geophysik, Leopold-Franzens-Universität, Innsbruck, Austria
- 1620 *C-Band Radar Backscatter of Sea Ice in the Weddell Sea, Antarctica, during the Austral Winter of 1992*
R. Hosseinmostafa and S. P. Gogineni, University of Kansas Center for Research, Inc., Lawrence, KS, USA
M. R. Drinkwater, JPL, California Institute of Technology, Pasadena, CA, USA
W. Dierking, Alfred Wegener Institut für Polar und Meeresforschung, Bremerhaven, Germany
- 1640 *Comparison of Measurements and Theory for Scattering From Simulated Saline Ice*
S. Beaven and S. P. Gogineni, University of Kansas Center for Research, Inc., Lawrence, KS, USA
K. Jezek, Ohio State University, Columbus, OH, USA
A. Gow and A. Lohanick, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH, USA

SESSION 4A1

Thursday, July 15, AM 0820-1200, Beckman Institute Auditorium
Organizer: G. Wanielek

RADAR POLARIMETRY: SIGNAL PROCESSING APPLICATIONS

Co-Chairpersons: E. Krogager, Danish Defense Research Establishment, Copenhagen, Denmark, and
E. Pottier, Laboratoire S2HF-IRESTE, Nantes, France

- 0820 *An Adaptive Polarimetric CFAR Detector*
K. Oumansour, Y. Wang, and E. Pottier, Laboratoire S2HF-IRESTE, Nantes, France
- 0840 *Experimental Evaluation of a Scattering Matrix Polarimetric CFAR*
A. Elias-Fusté, G. Salgado, and J. F. M. y A. Broquetas, ETSETB-UPC, Barcelona, Spain
- 0900 *Polarimetric Sensitive Array Processing Using Autoregressive Signal Estimation*
R. Schneider and G. Wanielik, Daimler-Benz AG, Ulm, Germany
- 0920 *Comparison of Different Classification Approaches in Multipolarization SAR Images*
S. Caillault, AEROSPATIALE, Cannes La Bocca, France
- 0940 *Location and Classification of Scatterer Mechanisms on Complex Target Using High Resolution Radar Images*
X. Fàbregas, A. Broquetas, J. Romeu, and L. Jofre, E.T.S. Eng. Telecomunicació, Barcelona, Spain
- 1000 **Coffee Break**
- 1020 *On the Mathematical Representation of Physical Reality in Coherent Polarimetric Radar Signal and Image Processing*
E. Krogager, Danish Defense Research Establishment, Copenhagen, Denmark
- 1040 *Mathematical Formulation and Solutions to the Effect of Rotation and Ellipticity on the Complex Scattering Matrix*
S. Bhagavathula, Daimler-Benz Research Center, Ulm, Germany
Ph. Hartl, Institute of Navigation, University of Stuttgart, Germany
- 1100 *A Signal Processing Algorithm for Data Reduction in Network Analyzer Based Polarimetric Scatterometer Systems*
S. Bhagavathula, Daimler-Benz Research Center, Ulm, Germany
Ph. Hartl, Institute of Navigation, University of Stuttgart, Germany
- 1120 *Similarity Measures for Target Characterization and Signal Processing Applications*
G. Wanielik, Daimler-Benz AG, Ulm, Germany
- 1140 *The Optimum Receiving of Completely Polarized Signals in the Presence of Partly Polarized Fields*
A. I. Kozlov and A. I. Logvin, MIIGA, Moscow, Russia
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SESSION 4A2

Thursday, July 15, AM 0840-1120, Baxter Lecture Hall

ANTENNA ARRAYS

Co-Chairpersons: S. R. Rengarajan, California State University, Northridge, CA, USA, and
J. R. Wait, Consultant in Electromagnetics, Tucson, AZ, USA

- 0840 *An Experimental DSP-Based Tracking Array*
T. B. Vu, G. Jonas, and T. Millet, University of New South Wales, Sydney, Australia
- 0900 *Soften Mutual Coupling Effect on a Spatially Smoothing Adaptive Array*
Y. Zhang, Oriental Science Laboratory Co., Ltd., Yokohama, Japan
K. Hirasawa and K. Fujimoto, University of Tsukuba, Tsukuba, Japan
- 0920 *Analysis of Shunt-Series Coupling Type of T-Junction*
G. S. N. Raju and P. M. Rao, A.U. College of Engineering, Visakhapatnam, India
- 0940 *A New Synthesis Method for the Array Antenna*
J.-L. Hu and S.-M. Liu, Northwestern Polytechnical University, Xian, Shaanxi, PRC
- 1000 **Coffee Break**
- 1020 *The Coupling Junction Effects in Waveguide-Fed Planar Slot Arrays*
S. R. Rengarajan, California State University, Northridge, CA, USA
G. M. Shaw, The Aerospace Corporation, El Segundo, CA, USA
- 1040 *Recent Advances in Waveguide-Fed Slot Arrays*
S. R. Rengarajan, California State University, Northridge, CA, USA
L. Josefsson, Ericsson Radar Electronics, Molndal, Sweden
- 1100 *A FEMTO Second Antenna Array of Submicrometer Metal Particle Embedded in Dielectric Material*
L. Guangyi, D. Bin, K. Xin, Electronics Research Institute, The Chinese Academy of Sciences, Beijing, PRC
C. FangYong, The Division of Technological Sciences, The Chinese Academy of Sciences, Beijing, PRC
D. ShiMin and C. LinMei, Beijing Institute of Radio Measurements, Beijing, PRC
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SESSION 4A3

Thursday, July 15, AM 0840-1120, Steele Laboratory, Room 102

Organizers: C. H. Chan and T. Cwik

ADVANCED COMPUTATIONAL METHODS AND MASSIVE PARALLEL COMPUTATION

Co-Chairpersons: C. H. Chan, University of Washington, Seattle, WA, USA, and
T. Cwik, JPL, California Institute of Technology, Pasadena, CA, USA

- 0840 *An Explicit Single Matrix Equation Method for Time Marching Electromagnetic Fields and Its Application to Parallel Computing*
R. F. Bowers, Boeing Defense and Space Group, Seattle, WA, USA
C. H. Chan, University of Washington, Seattle, WA, USA
- 0900 *Conformal Hybrid Finite Difference Time Domain and Finite Volume Time Domain*
K. S. Yee and J. S. Chen, Lockheed Palo Alto Research Laboratory, Palo Alto, CA, USA
C. H. Chan, University of Washington, Seattle, WA, USA
- 0920 *An Efficient Formulation of the Coupled Finite Element-Integral Equation Technique for Solving Large 3D Scattering Problems*
T. Cwik, V. Jamnejad, and C. Zuffada, JPL, California Institute of Technology, Pasadena, CA, USA
- 0940 *Massively Parallel Computation of RCS With Finite Elements*
J. Parker, JPL, California Institute of Technology, Pasadena, CA, USA
- 1000 **Coffee Break**
- 1020 *Whitney Elements Time Domain (WETD) Method*
J.-F. Lee, Worcester Polytechnic Institute, Worcester, MA, USA
- 1040 *Elimination of Numerical Dispersion in Finite-Difference Time-Domain Algorithms*
S. P. Castillo and S. Omick, New Mexico State University, Las Cruces, NM, USA
- 1100 *Hybrid Spectral/Spatial Technique for Frequency Selective Surfaces Rendered in Arbitrary Triangular Discretizations*
R. A. Kipp and C. H. Chan, University of Washington, Seattle, WA, USA
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SESSION 4A4

Thursday, July 15, AM 0840-1200, Downs Laboratory, Room 107

Organizers: E. Rodriguez and Y. Kim

ROUGH SURFACE SCATTERING

Co-Chairpersons: E. Rodriguez and Y. Kim, JPL, California Institute of Technology, Pasadena, CA, USA

- 0840 *Multiple Scattering From One-Dimensional Random Rough Surfaces—Full Wave Solutions*
E. Bahar and M. El-Shenawee, University of Nebraska, Lincoln, NE, USA
- 0900 *Numerical Solution of Scattering Fields From Rough Surface Using Full Wave Generalized Telegraphist Equations*
E. Bahar, Y. Zhang, and S. Shi, University of Nebraska, Lincoln, NE, USA
- 0920 *Frequency Selective Characteristic of Rough Surface Scattering*
K. S. Chen, National Central University, Taiwan, ROC
A. K. Fung, University of Texas, Arlington, TX, USA
- 0940 *The Small Slope Approximation for Wave Scattering From Neumann Surfaces*
K. Ivanova and S. L. Broschat, Washington State University, Pullman, WA, USA
E. I. Thorsos, Applied Physics Laboratory, College of Ocean and Fishery Sciences, University of Washington, Seattle, WA, USA
- 1000 **Coffee Break**
- 1020 *Wave Scattering From Periodic Rough Surfaces: Time-Domain Analysis of Oblique Incidence Case*
M. E. Veysoglu, R. T. Shin, J. A. Kong, MIT, Cambridge, MA, USA
- 1040 *Near Grazing Scattering From Non-Gaussian Ocean Surfaces*
Y. Kim and E. Rodriguez, JPL, California Institute of Technology, Pasadena, CA, USA
- 1100 *Rough Surface Scattering From Moving Ocean Surfaces as an Indicator of Scattering Mechanisms*
E. Rodriguez and Y. Kim, JPL, California Institute of Technology, Pasadena, CA, USA
- 1120 *Time-Varying Fractal Surface Scattering*
J. Chen, T. Lo, and J. Litva, McMaster University, Hamilton, Ontario, Canada
- 1140 *RCS-Calculation of Electrically Large Objects on Rough Surfaces*
H. Bender, Lehrstuhl für Hochfrequenztechnik, Technische Universität München, München, Germany
R. Suchar, IABG, Ottobrunn, Germany
P. Russer, Lehrstuhl für Hochfrequenztechnik, Technische Universität München, München, Germany, and Ferdinand-Braun-Institut für Höchstfrequenztechnik, Berlin, Germany
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SESSION 4A5

Thursday, July 15, AM 0800-1200, Downs Laboratory, Room 103

Organizer: A. Priou

**ELECTROMAGNETIC PROPAGATION IN COMPOSITE MATERIALS:
ELECTROMAGNETIC MODELING**

Co-Chairpersons: A. Priou, French Ministry of Defense, Paris, France, and
L. B. Felsen, Polytechnic University, Brooklyn, NY, USA

- 0800 *The Effect of Dissipative Inhomogeneous Medium on the Statistics of the Wave Intensity*
S. S. Saatchi, JPL, California Institute of Technology, Pasadena, CA, USA
- 0820 *Time Domain Modeling of Short Pulse Interaction With Composite Materials*
L. B. Felsen, Polytechnic University, Brooklyn, NY, USA
- 0840 *Anomalous Frequency Behaviors of Dielectric-Conductor Composites: A Theoretical Study*
T. Robin and B. Souillard, X-RS, Parc-Club, Orsay, France, and
Centre de Physique Théorique, Ecole Polytechnique, Palaiseau, France
- 0900 *Microwave and Infrared Properties of Composite Materials: Recent Advances of the Theory*
T. Robin and B. Souillard, X-RS, Parc-Club, Orsay, France, and
Centre de Physique Théorique, Ecole Polytechnique, Palaiseau, France
- 0920 *Modelling Electromagnetic Properties of Inhomogeneous Media: Morphological Approach*
J. Peiro, S. Berthier, and J. Lafait, Université Pierre et Marie Curie, Paris, France
- 0940 *How to Tailor and Orientate Metallic Helixes to Get Microwave Chirality*
S. Ougier, Université Paul Sabatier, Toulouse, France, and Matra Marconi Space,
Toulouse France
I. Chênerie, Université Paul Sabatier, Toulouse, France
S. Bolioli, CERT/ONERA, Toulouse, France
- 1000 **Coffee Break**
- 1020 *Modelization and Measurement of Heterogeneous Materials With Spherical Inclusions*
F. de Daran, V. Vignéras-Lefebvre, and J. P. Parneix, PIOM, CNRS, URA, Talence,
France
- 1040 *Electromagnetism in Chiral Media*
P. Hillion, Institut H. Poincaré, Paris, France
- 1100 *Microscopic Properties of Chiral Objects*
A. P. Vinogradov, A. N. Lagarkov, S. M. Matisin, K. N. Rozanov, I. V. Kukolev, and
V. N. Semenko, Scientific Center for Applied Electrodynamics, Russian Academy of
Sciences, Moscow, Russia
- 1120 *Composite Materials With Nonfresnel Reflection, A New Example of System With Spatial
Dispersion*
A. P. Vinogradov, I. G. Busarov, A. A. Kalachev, A. N. Lagarkov, and I. G. Sterlina,
Scientific Center for Applied Electrodynamics, Russian Academy of Sciences, Moscow,
Russia
- 1140 *Permittivity of Planar Percolation System*
A. P. Vinogradov, I. G. Busarov, and O. P. Posudnevsky, Scientific Center for Applied
Electrodynamics, Russian Academy of Sciences, Moscow, Russia

SESSION 4A6

Thursday, July 15, AM 0820-1120, Downs Laboratory, Room 11

Organizer: J. Behari

MEDICAL AND BIOLOGICAL APPLICATIONS OF MICROWAVES

Co-Chairpersons: J. Behari, Jawaharlal Nehru University, New Delhi, India, and
O. P. Gandhi, University of Utah, Salt Lake City, UT, USA

- 0820 *Effect of Amplitude Modulated Low Level Radiofrequency Radiation on the Central Cholinergic System of Developing Rat Brain*
K. K. Kunjilwar and J. Behari, Jawaharlal Nehru University, New Delhi, India
- 0840 *Temperature Profile Studies in a Muscle Phantom Using Interstitial Microwave Antennas*
J. Behari and Z. C. Alex, Jawaharlal Nehru University, New Delhi, India
- 0900 *Field Induced in Head Model of Man Irradiated at Microwave Frequencies*
B. Khillare, National Institute of Health and Family Welfare, New Delhi, India,
J. Behari, Jawaharlal Nehru University, New Delhi, India
- 0920 *A Model for Microwave Propagation in Skin-Fat Muscle Combination*
J. Behari, Jawaharlal Nehru University, New Delhi, India
B. D. Khillare, National Institute of Health and Family Welfare, New Delhi, India
- 0940 *A Simple Convolution Procedure for Calculating Coupling to the Human Body of EM Fields of Prescribed Time and Space Variations*
O. P. Gandhi, J.-Y. Chen, C. M. Furse, and Y. Cui, University of Utah, Salt Lake City, UT, USA
- 1000 **Coffee Break**
- 1020 *Electric Field and Current Density Distributions Induced in an Anatomically Based Model of the Human Head by Magnetic Fields of a Hair Dryer*
S. Tofani, P. Ossola, and G. d'Amore, Laboratorio di Sanità Pubblica, Ivrea, Italy
O. P. Gandhi, University of Utah, Salt Lake City, UT, USA
- 1040 *Medical Applications for an Autobalanced 2-4 GHz Radiometer Including an Autocalibration Procedure: Theoretical Aspect and Applications to the Monitoring of Microwave Hyperthermia System*
J. P. Sozanski, B. Buys, J. C. Lesage, G. Dhelin, and Y. Moschetto, U 279 INSERM, Lille, France
M. Chive, IEMN UMR 9929 CNRS USTL, Lille, France
- 1100 *Effects of High Power Density Microwave Radiation*
K. S. Nageswari, Defense Institute of Physiology & Allied Sciences, Delhi, India
K. R. Sarma, CSIO, Chandigarh, India
R. Sharan, India Institute of Technology, Kanpur, India

SESSION 4A7

Thursday, July 15, AM 0820-1200, Lauritsen Laboratory, Room 269

Organizers: V. P. Kodali and O. Hartal

**ELECTROMAGNETIC COMPATIBILITY IN EQUIPMENT AND INTEGRATED CIRCUIT
PACKAGING TECHNOLOGIES**

Co-Chairpersons: V. P. Kodali, Government of India, Department of Electronics, New Delhi, India, and
H. W. Denny, Georgia Tech Research Institute, Atlanta, GA, USA

- 0820 *Critique on Electromagnetic Compatibility in Equipment Packaging*
V. P. Kodali, Government of India, Department of Electronics, New Delhi, India
A. Sanyal, R. Sivaramakrishnan, and A. Gupta, SAMEER Centre for Electromagnetics,
Madras, India
- 0840 *An Overview, Description and Evaluation of EMC Test Facilities*
J. D. M. Osburn and E. L. Bronaugh, The Electro-Mechanics Company, Austin, TX, USA
- 0900 *A Novel Method for Generation of Predominantly Electric or Magnetic Field in Free Space*
A. L. Das, A. K. Shrivastav, and B. K. Sinha, SAMEER Centre for Electromagnetics,
Madras, India
B. N. Das, Indian Institute of Technology, Kharagpur, India
- 0920 *An Optically Linked Three Loop Antenna System for Measuring the Radiation Characteristics
From a Small Electric Source*
M. Kanda, National Institute of Standards and Technology, Boulder, CO, USA
- 0940 *Techniques for Evaluating the Performance of EMI Gaskets*
H. W. Denny and D. M. LaGesse, Georgia Tech Research Institute, Atlanta, GA, USA
- 1000 **Coffee Break**
- 1020 *Slot Aperture Effects on Shielding Integrity*
M. Mezzer and O. Hartal, EM Division, Haifa, Israel
- 1040 *Organised Electronic Packaging for Better Electromagnetic Compatibility—A Case Study on a
Switch Mode Power Supply System*
K. V. K. Sampath, A. Sanyal, and S. Karunakaran, SAMEER Centre for
Electromagnetics, Madras, India
- 1100 *Electromagnetic Susceptibility Assessment of an Electro-Optic Modulator*
J. K. Daher and G. H. Champion, Georgia Tech Research Institute, Atlanta, GA, USA
M. F. Seifert, Rome Laboratory/ERPT, Hanscom AFB, MA, USA
- 1120 *Electromagnetic Coupling and Radiation Analysis of Lossy Interconnection Lines in High
Speed Logic Circuits*
S.V. K. Shastri, V. K. Hariharan, and V. R. Katti, ISRO Satellite Centre, Bangalore, India
- 1140 *A Circuit Approach to Analyzing Magnetic Field Shielding Characteristics for Gaps in Metal
Enclosures*
T. Harada, NEC Corporation, Kanagawa, Japan
Y. Kami, University of Electro-Communications, Tokyo, Japan
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SESSION 4A8

Thursday, July 15, AM 0800-1140, Keck Laboratories, Room 42

TRANSMISSION LINES

Co-Chairpersons: T. Itoh, University of California, Los Angeles, CA, USA, and
B. W. Lu, Institute of Electronics, Beijing, PRC

- 0800 *Coupled Power Equations for Lossy Transmission Lines*
N. Jackman and H. E. Rowe, Stevens Institute of Technology, Hoboken, NJ, USA
- 0820 *Rigorous Analysis of Image Guides and Dielectric Resonators by a Coupled Transmission Lines Method (CTLM)*
M. Essaaidi, Tetouan, Morocco
- 0840 *Elements of Nonstationary Theory of Parallel-Plate Waveguides*
L. V. Vavriv and A. E. Serebrjannikov, Research and Engineering Institute
"MOLNIJA," Kharkov Polytechnical Institute, Kharkov, Ukraine
- 0900 *Analysis of a Grating Coupler With a Periodic Groove Structure of Finite Extent*
M. Tomita, University of Electro-Communications, Tokyo, Japan
- 0920 *Effect of Dielectric Filling in the Slot Region of an H-Plane Tee Junction*
D. Satyanarayana and A. Chakraborty, Indian Institute of Technology, Kharagpur,
India
- 0940 *Exact Solution of the AC Resistance of a Lossy Round Two-Wire Transmission Line*
B.-Z. Wang, Y. Zhao, and W. Lin, Institute of Applied Physics, University of Electronic
Science and Technology, Chengdu, PRC
- 1000 **Coffee Break**
- 1020 *Investigation of Various Air-Bridge Structures Within Coplanar Bends and T-Junctions
by a Full-Wave Method*
T. Becks and I. Wolff, Duisburg University, Duisburg, Germany
- 1040 *Switching Characteristic of a Novel Nonlinear Tapered Directional Coupler*
G. S. Pu, T. Mizumoto, and Y. Naito, Tokyo Institute of Technology, Tokyo, Japan
- 1100 *Bidirectional Beam Propagation Method*
M. Matsuhara, Osaka University, Osaka, Japan
- 1120 *New Integral Equations for CAD of Electron Waveguide Circuits*
K. Tanaka, Y. Yoshino, H. Ootera, M. Tanaka, and H. Tashima, Gifu University, Gifu
City, Japan
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SESSION 4A9

Thursday, July 15, AM 0820-1200, Beckman Laboratories, Room 24

Organizer: P. Pampaloni

MICROWAVE RADIOMETRY FOR REMOTE SENSING

Co-Chairpersons: P. Pampaloni, CNR/IROE, Florence, Italy, and
J. R. Wang, NASA/Goddard Space Flight Center, Greenbelt, MD, USA

- 0820 *Spaceborne Microwave Radiometry, Present and Future Missions*
K. F. Künzi, Institute of Remote Sensing, University of Bremen, Bremen, Germany
- 0840 *Microwave Radiometric Measurements of Water Vapor Profiles SSM/T-2 and MIR*
J. R. Wang, NASA/Goddard Space Flight Center, Greenbelt, MD, USA
A. J. Gasiewski, Georgia Institute of Technology, Atlanta, GA, USA
V. Falcone, Phillips Laboratory, Hanscom AFB, MA, USA
- 0900 *Precipitation Retrieval From SSM/I Microwave Radiometer Using Multivariate Analysis of Cloud Radiative Models*
P. Basili, P. Ciotti, G. d'Auria, F. S. Marzano, and P. Pierdicca, Università di Roma "La Sapienza," Rome, Italy
- 0920 *A Dual-Frequency Airborne Microwave Radiometer for Geophysical Applications*
L. S. Fedor, J. B. Snider, and E. R. Westwater, NOAA/ERL/Wave Propagation Laboratory, Boulder, CO, USA
- 0940 *Restoration of Radiometer Images*
H. Suess and C. Winkel, German Aerospace Research Establishment, Institute for Radio Frequency Technology, Oberpfaffenhofen, Germany
- 1000 **Coffee Break**
- 1020 *Polarimetric Thermal Emission From Rough Surfaces*
J. T. Johnson, J. A. Kong, R. T. Shin, and D. H. Staelin, MIT, Cambridge, MA, USA
S. H. Yueh, S. V. Nghiem, and R. Kwok, JPL, California Institute of Technology, Pasadena, CA, USA
K. O'Neill and A. Lohanick, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH, USA
- 1040 *Modeling Soil Microwave Emission Through the Continuous Approach—Experimental Validation*
L. Laguerre, Laboratoire d'Etudes et de Recherches en Télédétection Spatiale, Toulouse, France
J.-C. Calvet, Centre National de Recherches Météorologiques, Toulouse, France
J.-P. Wigneron and A. Chanzy, Institut National de la Recherche Agronomique, Montfavet, France
Y. H. Kerr, Laboratoire d'Etudes et de Recherches en Télédétection Spatiale, Toulouse, France
- 1100 *Passive Microwave Signatures of Grass*
C. Mätzler, Institute of Applied Physics, University of Bern, Bern, Switzerland
- 1120 *Radiometric Reflection, Transmission, and Emission Measurements on Tree Components*
U. Wegmüller, C. Mätzler, and T. Weise, University of Bern, Bern, Switzerland
- 1140 *Detection of Land Parameters in Mediterranean Areas With SSM/I*
S. Paloscia, P. Pampaloni, and C. Susini, CNR-IROE, Florence, Italy
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SESSION 4P1

Thursday, July 15, PM 1320-1640, Beckman Institute Auditorium

Organizer: W.-M. Boerner

RADAR POLARIMETRY: SYSTEMS APPLICATION AND RADAR METEOROLOGY

Co-Chairpersons: D. S. Zrnic, NOAA, Norman, OK, USA, and
A. B. Shupiatzky, Central Aerological Observatory, Moscow, Russia

- 1320 *Recent Advances in Polarimetric Doppler Radar Meteorology at DLR*
A. Schroth, M. Chandra, A. Hornbostel, E. Lüneburg, and V. Ziegler, DLR,
Oberpfaffenhofen, Germany
- 1340 *Use of Polarization and Statistical Characteristics of Radar Signals in Detecting Areas in
Clouds Dangerous for Aircraft Flying*
A. B. Shupiatzky, Central Aerological Observatory, Moscow, Russia
F. I. Yanovsky, Kiev Civil Aviation Engineering Institute, Kiev, Russia
- 1400 *Polarimetric Measurements of Precipitation at NOAA's National Severe Storms Laboratory*
D. S. Zrnic, NOAA, Norman, OK, USA
- 1420 *A Model for Backscattering of Radar Signal in Hydrometeors*
E. Skirta, A. Khenchaf, and J. Sailiard, Laboratory S2HF-IRESTE, Nantes, France
- 1440 *Application Aircraft Meteorological Polarization Radar for Studying Meso- and Micro-
Structure of Clouds and Precipitation*
S. V. Antipovsky, A. V. Kochin, V. R. Megalinsky, and A. B. Shupiatzky, Central
Aerological Observatory, Moscow, Russia
- 1500 **Coffee Break**
- 1520 *Seismo-Electromagnetologic Recordings in the ULF/ELF Bands Prior/During/After
Lithospheric Stress Conditions, Earthquakes and Volcano Eruptions in SW California*
J. Y. Dea and P. M. Hansen, NCCOSC-NRaD, San Diego, CA, USA
A. W. Green, Jr., USGS Golden Research Facilities, Denver, CO, USA
W.-M. Boerner, University of Illinois, Chicago, IL, USA
- 1540 *The Existence of Regional Low Noise ULF/ELF Spectral Polarimetric Windows for Detecting
Earth/Sea-Prequake Radiation Signatures of Lithospheric Stress Conditions and Tentative
Modeling of Seismo-electromagnetologic Radiation Emission Source Mechanisms*
J. Y. Dea and P. M. Hansen, NCCOSC-NRaD, San Diego, CA, USA
A. W. Green, Jr., USGS Golden Research Facilities, Denver, CO, USA
W.-M. Boerner, University of Illinois, Chicago, IL, USA
- 1600 *Ground Based Polarimetric Radar Imaging at DLR, an Overview*
A. Schroth, K.-H. Bethke, M. Chandra, W. Herdeg, A. Hornbostel, and
U. Fuchs, DLR, Oberpfaffenhofen, Germany
- 1620 *Modern Polarization Antenna Realization and Application to Radar Meteorology*
E. A. Mueller, and V. N. Bringi, Colorado State University, Fort Collins, CO, USA
W.-M. Boerner, University of Illinois, Chicago, IL, USA

SESSION 4P2

Thursday, July 15, PM 1320-1640, Baxter Lecture Hall
Organizer: G. S. N. Raju

ARRAY APPLICATIONS

Co-Chairpersons: G. S. N. Raju, A.U. College of Engineering, Visakhapatnam, India, and
R. J. Maillaux, Rome Air Development Center, Hanscom, MA, USA

- 1320 *Data on Radiation Patterns for Different Amplitude Distributions*
M. V. V. Prasad and V. M. Rao, GITAM College of Engineering, Visakhapatnam, India
- 1340 *Design of Narrow Beam Antenna*
G. S. N. Raju, A.U. College of Engineering, Visakhapatnam, India
V. Sarvani, Indianapolis, IN, USA
- 1400 *Sector Beams From Array Antennas*
N. S. Raju, HCL, Hyderabad, India
G. S. N. Raju, A.U. College of Engineering, Visakhapatnam, India,
S. R. K. Paramahamsa, College of Engineering, Bapatla, India
- 1420 *Effect of Element Length on Array Patterns*
V. M. Rao, GITAM College of Engineering, Visakhapatnam, India
G. S. N. Raju, A.U. College of Engineering, Visakhapatnam, India
M. K. Gokaraju, Know Lake Gardens, Hiawatha, NJ, USA
- 1440 *Generation of Useful Sum and Difference Patterns*
V. Sarvani, Indianapolis, IN, USA
Y. S. Sudhakar, IIT, Madras, India
D. V. Rao, REC, Andhra Pradesh, India
- 1500 **Coffee Break**
- 1520 *A Method of Beam Broadening*
G. S. Chakraborty and K. R. Gottumukkala, A U. College of Engineering,
Visakhapatnam, India
A. Chakraborty, IIT, Kharagpur, India
K. V. S. N. Raju, SRKR Engineering College, Bhimavaram, India
- 1540 *Optical Beam Forming Techniques for Phased Array Antennas*
T. K. Wu and C. Chandler, JPL, California Institute of Technology, Pasadena, CA, USA
- 1600 *Electromagnetic Interactions in a Large Phase Array Airborne Radar Antenna*
C. H. Tang, The MITRE Corporation, Bedford, MA, USA
- 1620 *Simple Partially Adaptive Antenna Array Techniques for Interference Detection and Elimination*
M. A. Aboul-Dahab, Arab Marine Transport Academy, Alexandria, Egypt
S. E. El-Khamy, Alexandria University, Alexandria, Egypt
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SESSION 4P3

Thursday, July 15, PM 1320-1640, Steele Laboratory, Room 102
Organizer: D. E. Stein

PHYSICAL MECHANISM EXTRACTION FROM COMPUTATIONAL METHODS

Co-Chairpersons: D. E. Stein, Applied Computational Electromagnetics Society, Linthicum Heights, MD, USA, and D. G. Dudley, University of Arizona, Tucson, AZ, USA

- 1320 *Simulated Annealing as a Computational Tool for the Characterization of Defects in Conductive Materials*
R. de Oliveira Bohbot, D. Lesselier, and B. Duchêne, CNRS-ESE, Gif-sur-Yvette, France
- 1340 *Three Dimensional Imaging of Buried Objects Using FMCW Radar*
J. I. Agbinya, La Trobe University, Bundoora, Victoria, Australia
- 1400 *Steps Towards Intelligent Numerical Analysis of Measured Data*
Ch. Hafner and G. Klaus, Swiss Federal Institute of Technology, Zurich, Switzerland
- 1420 *A Computer Simulation and Visualization Model for Radar-Target Feature Interpretation*
C. L. Yu, Naval Air Warfare Center Weapons Division, Point Mugu, CA, USA
S. W. Lee, University of Illinois, Urbana, IL, USA
- 1440 *Wave Field Splitting, Invariant Imbedding, and Phase Space Methods in Direct and Inverse Wave Propagation Modeling*
L. Fishman, Colorado School of Mines, Golden, CO, USA
- 1500 **Coffee Break**
- 1520 *Observable-Based Parametrization of Numerical Data*
L. B. Felsen, Polytechnic University, Brooklyn, NY, USA
- 1540 *Extraction of Scattering Centres Using Polarization and Depolarization Signatures*
V. Sampath and G. Y. Delisle, INRS-Télécommunications, Île-des-Sœurs, Québec, Canada
- 1600 *Resonances in the EM Interactions With a Slotted Conducting Rectangular Cylinder and Their Suppressions*
L.-K. Wu and C.-H. Lu, National Chiao Tung University, Taiwan, ROC
- 1620 *High-Frequency Scattering Interpretation of Microwave Images*
R. Tiberio, S. Maci, and A. Toccafondi, University of Florence, Florence, Italy
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SESSION 4P4

Thursday, July 15, PM 1320-1720, Towns Laboratory, Room 103

DIFFRACTION

Co-Chairpersons: L. B. Felsen, Weber Research Institute, Polytechnic University, Brooklyn, NY, USA, and
E. Bahar, University of Nebraska, Lincoln, NE, USA

- 1320 *Plane Wave Diffraction by Two- and Three-part Thin Dielectric Plane*
A. Büyükkaksoy and A. Alkumru, Technical University of Istanbul, Turkey
- 1340 *Floquet-Mode-Adapted Geometrical Theory of Diffraction for Frequency and Time-Domain Scattering From Nonuniform Truncated Gratings*
L. B. Felsen, L. Carin, and T.-T. Hsu, Weber Research Institute, Polytechnic University, Brooklyn, NY, USA
- 1400 *A Modal Formulation for the Diffraction by Thick Capacitive Grids*
R. C. McPhedran and D. H. Dawes, University of Sydney, Australia
- 1420 *Optimization of Trapezoidal Gratings for DFB and DBR Lasers*
M. H. Rahnnavard, A. Bakhtazad, H. Sarmadi, and H. Abiri, Shiraz University, Shiraz, Iran
- 1440 *Radiation Characteristics of Dielectric Crossed-Grating Structures*
N. Urimindi, G. A. Evans, and J. K. Butler, Southern Methodist University, Dallas, TX, USA
- 1500 **Coffee Break**
- 1520 *Theoretical and Numerical Study of Grating by the Method of Lines*
K. Liu and W. Hong, Southeast University, Nanjing Jiangsu, PRC
- 1540 *Light Diffraction Pattern Modified by Reflection at Volume Grating Boundaries*
S. A. Maksimenko, Research Institute for Nuclear Problems, Minsk, Belarus
- 1600 *The Method of Fictitious Sources as Applied to E.M. Diffraction by Cylindrical Obstacles*
R. Petit and F. Zolla, Laboratoire d'Optique Electromagnétique, U.R.A. au CNRS, Marseilles, France
- 1620 *Electromagnetic Plane Wave Diffraction by a Screen Residing Between Two Dielectric Media: Nonuniform and Quasi-Uniform Asymptotic Solutions*
A. Ciarkowski, Polish Academy of Sciences, Warsaw, Poland
- 1640 *On the Field Continuity Condition in the Problem of Electromagnetic Plane Wave Diffraction by a Half-Plane Residing on the Interface of Two Media*
A. Ciarkowski, Polish Academy of Sciences, Warsaw, Poland
- 1700 *Diffraction of Ultrashort Phase-Modulated Light Pulse by Volume Grating*
V. G. Baryshevsky and S. A. Maksimenko, Research Institute for Nuclear Problems, Minsk, Belarus

SESSION 4P5

Thursday, July 15, PM 1320-1700, Downs Laboratory, Room 103

Organizer: A. Priou

**ELECTROMAGNETIC PROPAGATION IN COMPOSITE MATERIALS:
MEASUREMENT TECHNIQUES**Co-Chairpersons: A. Priou, French Ministry of Defense, Paris Armée, France, and
Cl. M. Weil, National Institute of Standards and Technology, Boulder, CO, USA

- 1320 *Normalization Project for Microwave Materials*
P. Guillon, IRCOM, URA CNRS, Limoges, France
- 1340 *The Electromagnetic Properties of Materials Program at NIST*
Cl. M. Weil, National Institute of Standards and Technology, Boulder, CO, USA
- 1400 *Measurements in Free Space at CEAT: The CAREM Bench*
G. Menard, Centre d'Essais Aéronautique de Toulouse, Toulouse, France
- 1420 *Measurement of Chiral Media: Method and Practical Examples*
S. Ougier, Université Paul Sabatier, Toulouse, France, and Matra Marconi Space,
Toulouse, France
I. Chénierie, Université Paul Sabatier, Toulouse, France
A. Priou, Ministry of Defense, Paris Armée, France
- 1440 *RF and Microwave Dielectric and Magnetic Characterization of Ferrites*
R. G. Geyer, National Institute of Standards and Technology, Boulder, CO, USA
- 1500 **Coffee Break**
- 1520 *Microwave Characterization of Heterogeneous Materials: Problems of Measurements*
G. Mazé-Merceur, C.E.A./C.E.S.T.A., Le Barp, France
- 1540 *Microwave Near-Field Techniques for the Control of Composite Materials*
J. Ch. Bolomey, SUPÉLEC, Plateau du Moulon, Gif-sur-Yvette, France
- 1600 *Mapping of Variances in Wall Uniformity With Focused Beams*
T. Wells, GTRI/STL, Georgia Institute of Technology, Atlanta, GA, USA
- 1620 *Broad-band Microwave Characterization and Material Volume: A Solution for Thin
Conductive Films in a Two-Layers Structure*
N. Belhadj-Tahar and A. Fourier-Lamer, Laboratoire de Dispositifs Infrarouge et
Microondes, Université Pierre et Marie Curie, Paris, France
- 1640 *Microwave and Millimeter-Wave Free-Space Measurements of Lossy and Low-Loss Chiral
Materials*
F. Guérin, Thomson-CSF Central Research Laboratories, Orsay, France, and IRCOM,
University of Limoges, Limoges, France
M. Labeyrie, Thomson CSF Central Research Laboratories, Orsay, France
P. Guillon, IRCOM, University of Limoges, Limoges, France

SESSION 4P6

Thursday, July 15, PM 1340-1640, Downs Laboratory, Room 11

Organizer: S. Wright

BIOMEDICAL APPLICATIONS OF COMPUTATIONAL ELECTROMAGNETICS

Co-Chairpersons: S. M. Wright, Texas A&M University, College Station, TX, USA, and
A. F. Peterson, Georgia Institute of Technology, Atlanta, GA, USA

- 1340 *Electromagnetic Field Computation in Biomedicine—Industrial Applications and Needs*
W. Dürr, Siemens AG, Medical Division, Erlangen, Germany
- 1400 *Microwave Tomographic Imaging for Medical Diagnosis and Therapy*
M. Vester, Siemens AG, Corporate Research and Development, Erlangen, Germany
- 1420 *Computational Electromagnetics for Medical Applications Using a Massively Parallel Computer*
A. King, Sandia National Laboratories, Albuquerque, NM, USA
D. Scott, Intel Supercomputer Systems, Hillsboro, OR, USA
- 1440 *3D Bioelectromagnetic Computation on Finite Elements*
K. D. Paulsen and D. R. Lynch, Dartmouth College, Hanover, NH, USA
W. E. Boyse, Lockheed Missiles and Space Co., Palo Alto, CA, USA
- 1500 **Coffee Break**
- 1520 *Analysis of Conformable Direct-Contact Antennas for Hyperthermia and Medical Imaging Applications*
R. M. Najafabadi and A. F. Peterson, Georgia Institute of Technology, Atlanta, GA, USA
- 1540 *Computation of the SAR in Lossy Heterogeneous Bodies Using the Current-Model Technique*
A. Boag and A. Boag, University of Illinois at Urbana-Champaign, Urbana, IL, USA
Y. Leviatan, Technion-Israel Institute of Technology, Haifa, Israel
- 1600 *Computation and Visualization of Currents in the Body of a Child Induced by Electromagnetic Field of an Electric Blanket*
I. Chatterjee and Y. Liu, University of Nevada, Reno, NV, USA
R. Schweitzer, UNS Computing Services, University of Nevada, Reno, NV, USA
- 1620 *Analysis of Electrically Small Resonator Arrays for Magnetic Resonance Imaging Using the FFT and Conjugate Gradient Method*
S. M. Wright, Texas A&M University, College Station, TX, USA
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SESSION 4P7

Thursday, July 15, PM 1340-1620, Lauritsen Laboratory, Room 269

Organizer: D. Chrisey

MICROWAVE APPLICATIONS OF FERROELECTRIC THIN FILMS

Co-Chairpersons: D. Chrisey, Naval Research Laboratory, Washington, DC, USA, and
H. C. Huang, Shanghai University of Science and Technology, PRC

- 1340 *DC Electric Field Modulated Microwave Surface Impedance in YBa₂Cu₃O₇/SrTiO₃/YBa₂Cu₃O₇ Trilayers*
A. T. Findikoglu, C. Doughty, Q. Li, X. X. Xi, S. M. Anlage, and T. Venkatesan, Center for Superconductivity Research, University of Maryland, College Park, MD, USA,
- 1400 *Electrically Tunable HTS Antenna Using Ferroelectric Trilayer Capacitors*
A. M. Martin and D. R. Bowling, Naval Air Warfare Center Weapons Division, China Lake, CA, USA
D. Galt and J. C. Price, University of Colorado, Boulder, CO, USA
J. A. Beall and R. H. Ono, National Institute of Standards and Technology, Boulder, CO, USA
- 1420 *Novel Monolithic Phase Shifter Combining Ferroelectrics and High Temperature Superconductors*
C. M. Jackson, J. H. Kobayashi, A. Lee, C. Pettiette-Hall, J. P. Burch, A. Kain, R. Hilton, J. McDade, and R. Hu, TRW Space and Electronics Group, Redondo Beach, CA, USA
- 1440 *Use of Thin and Thick Film Ferroelectric Materials in Microwave Lumped-Element Varactors*
W. C. Drach, W. D. Wilber, M. A. Dornath-Mohr, T. E. Kosciwa, and R. W. Babbitt, Army Research Laboratories, Fort Monmouth, NJ, USA
L. C. Sengupta, Army Research Laboratories, Watertown, MA, USA
- 1500 **Coffee Break**
- 1520 *Microwave Circuit Elements With Ferroelectric and High Temperature Superconducting Thin Films*
K. R. Carroll, J. M. Pond, D. B. Chrisey, J. S. Horwitz, and K. S. Grabowski, Naval Research Laboratory, Washington, DC, USA
- 1540 *Fine-Tuning the Microwave Transport Properties of Ferroelectric Thin Films Using the Pulsed Laser Deposition Technique*
R. E. Leuchtner, University of New Hampshire, Durham, NH, USA
D. B. Chrisey, J. S. Horwitz, J. M. Pond, and K. R. Carroll, Naval Research Laboratory, Washington, DC, USA
- 1600 *HTS/Ferroelectric Multilayer Thin Films for Microwave Applications*
J. S. Horwitz, D. B. Chrisey, C. M. Cotell, J. M. Pond, K. R. Carroll, and K. S. Grabowski, Naval Research Laboratory, Washington, DC, USA

SESSION 4P8

Thursday, July 15, PM 1320-1700, Keck Laboratories, Room 42

WAVEGUIDES AND WAVEGUIDE COMPONENTS II

Co-Chairpersons: E. Heidrich, University of Karlsruhe, Karlsruhe, Germany, and
W. Lin, University of Electronic Science and Technology, Chengdu, PRC

- 1320 *Some Recent Work on Inset Dielectric Guides With Anisotropic Dielectric Substrate or Magnetized Ferrite*
Z. Fan and S. R. Pennock, University of Bath, Bath, UK
- 1340 *Electromagnetic Fields in Metallic Enclosures Lines With Resistive Material*
M. A. Tassoudji, K. Li, R. T. Shin, and J. A. Kong, Research Laboratory of Electronics, MIT, Cambridge, MA, USA
M. J. Tsuk, Digital Equipment Corporation, Maynard, MA, USA
- 1400 *Accurate Method of Moments Analysis of Single- and Multi-Layered Graded-Index Dielectric Slab Waveguide Structures*
A. Weisshaar, Oregon State University, Corvallis, OR, USA
- 1420 *Electromagnetic Field Analysis of Integrated Optical Tapered Couplers and Filters Using Conformal Mapping*
Y. Miyazaki, Toyohashi University of Technology, Toyohashi, Japan
- 1440 *Some Aspects of Elliptical Waveguide Performance*
A. L. Cullen, University College, London, UK
- 1500 **Coffee Break**
- 1520 *Time-Harmonic Dyadic Green's Function for Elliptical Waveguide Filled With Biisotropic Medium*
D. Cheng, Y. Zhao, and W. Lin, Institute of Applied Physics, University of Electronic Science and Technology of China, Chengdu, PRC
- 1540 *Propagation and End-Radiation Characteristics of Elliptical Waveguide Filled With a Biisotropic Medium*
D. Cheng, Y. Zhao, and W. Lin, Institute of Applied Physics, University of Electronic Science and Technology of China, Chengdu, PRC
- 1600 *Radiation Characteristics of an Open-Ended Waveguide Illuminating a Layered Sphere*
I. A. Ali, King Faisal University, Al-Ahssa, Saudi Arabia
- 1620 *Introducing "Wave Permittivity" and "Wave Permeability" in Non-TEM Transient Wave Propagation Phenomena*
G. C. Giakos, University of Tennessee, Memphis, TN, USA
- 1640 *Complicated Resonance Phenomenon Modeling for Open Waveguide Resonators*
I. E. Pochanina and N. P. Yashina, Institute of Radiophysics and Electronics, Academy of Sciences of Ukraine, Kharkov, Ukraine

SESSION 4P9

Thursday, July 15, PM 1320-1700, Beckman Laboratories, Room 24

Organizer: M. Borgeaud

PASSIVE MICROWAVE REMOTE SENSING FOR SPACEBORNE APPLICATIONS

Co-Chairpersons: M. Borgeaud and Y. Ménard, ESA/ESTEC, Noordwijk, The Netherlands

- 1320 *The Design of the ESA Multiband Imaging Microwave Radiometer (MIMR)*
Y. Ménard, ESA/ESTEC, Noordwijk, The Netherlands
O. F. d'Anton, ACRI, Sophia Antipolis, Valbonne, France
- 1340 *Passive Microwave Remote Sensing Applications for MIMR*
M. Borgeaud and J. Noll, ESA/ESTEC, Noordwijk, The Netherlands
A. Rognes, ESA/ESRIN, Frascati, Italy
- 1400 *Simulated Retrieval of Land Surface Parameters Using Multichannel Satellite Microwave Radiometry*
E. G. Njoku and B. Rague, JPL, California Institute of Technology, Pasadena, CA, USA
- 1420 *Microwave Signature Data-Base on Soil*
U. Wegmüller, R. Hüppi, and C. Mätzler, University of Bern, Bern, Switzerland
- 1440 *The Effect of Wind Direction on MIMR Geophysical Retrievals*
F. J. Wentz, Remote Sensing Systems, Santa Rosa, CA, USA
- 1500 **Coffee Break**
- 1520 *Measurements of Water Vapour Continuum Absorption and Sea Surface Reflectance at 89 and 157 GHz Using an Airborne Microwave Radiometer*
S. J. English, D. C. Jones, and R. W. Saunders, UK Meteorological Office, Remote Sensing Branch, Farnborough, UK
C. Guillou and C. Prigent, Laboratoire de Radioastronomie Millimétrique, Observatoire de Meudon, France
- 1540 *Retrieval of Atmospheric Parameters Using Spaceborne Passive Microwave Remote Sensing Data*
K. F. Küenzi and J. Langen, Institute of Remote Sensing, University of Bremen, Bremen, Germany
- 1600 *Synergism of Active and Passive Microwave Data for Estimating Bare Surface Soil Moisture*
S. S. Saatchi and E. Njoku, JPL, California Institute of Technology, Pasadena, CA, USA
U. Wegmüller, Institute of Applied Physics, University of Bern, Bern, Switzerland
- 1620 *Polarimetric Thermal Emission From Periodic Water Surfaces*
S. H. Yueh, S. V. Nghiem, R. Kwok, W. J. Wilson, F. K. Li, JPL, California Institute of Technology, Pasadena, CA, USA
J. T. Johnson and J. A. Kong, MIT, Cambridge, MA, USA
- 1640 *MIRAS, a Two-Dimensional Passive Aperture Synthesis Radiometer*
M. Martín-Neira, ESA/ESTEC, Noordwijk, The Netherlands

SESSION 5A1

Friday, July 16, AM 0820–1140, Beckman Institute Auditorium

Organizer: A. B. Kostinski

RADAR POLARIMETRY: METEOROLOGICAL APPLICATIONS

Co-Chairpersons: A. B. Kostinski, Michigan Technological University, Houghton, MI, USA, and
A. V. Ryzhkov, NOAA-ERL/NSSL, Norman, OK, USA

- 0820 *Multiple Scattering Effects on the Linear Depolarization Ratio (LDR) Measured During CaPE by a Ka-Band Air-borne Radar*
T. Iguchi, Universities Space Research Association, NASA/GSFC, Greenbelt, MD, USA
R. Meneghini, NASA/GSFC, Greenbelt, MD, USA
- 0840 *On the Meteorological Parameterization of Specific Attenuation and Phase in Rain for Use in Numerical Models and the Retrieval of Rainfall Rate and Rain Water Content From Measurements*
A. R. Jameson, Applied Research Corp., Landover, MD, USA
- 0900 *Polarimetric Radar Scattering From Cloud Ice Crystals at 94 and 220 GHz*
K. Aydin and C. Tang, Pennsylvania State University, University Park, PA, USA
- 0920 *Ice Water Content Estimate Using Multiparameter Radar Observations*
J. Vivekanandan, NCAR, Boulder, CO, USA
- 0940 *On the Use of Optimal Polarizations for Studying the Microphysics of Precipitation*
J. M. Kwiatkowski and A. B. Kostinski, Michigan Technological University, Houghton, MI, USA
A. R. Jameson, Applied Research Corp., Landover, MD, USA
- 1000 **Coffee Break**
- 1020 *Spaceborne Radar Sensing of Precipitation Above an Ocean Surface: Polarization Contrast Study*
A. B. Kostinski and J. M. Kwiatkowski, Michigan Technological University, Houghton, MI, USA
A. R. Jameson, Applied Research Corp., Landover, MD, USA
- 1040 *Applications of Elliptical Polarization for Remote Sensing of Clouds and Precipitation*
A. V. Ryzhkov, NOAA-ERL/NSSL, Norman, OK, USA
- 1100 *Multipath Effect Due to Rain at 30–50 GHz Frequency Communication Links*
D. A. de Wolf, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA
L. P. Ligthart, TU Delft, The Netherlands
- 1120 *Hydrometer Scatter Interference on Microwave Links With Emphasis on the Melting-Snow Layer*
R. A. Hulays and M. M. Z. Kharadly, University of British Columbia, Canada
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SESSION 5A2

Friday, July 16, AM 0820-1140, Baxter Lecture Hall

SPECIAL ANTENNAS AND APPLICATIONS

Co-Chairpersons: J. Huang, JPL, California Institute of Technology, Pasadena, CA, USA, and
K. Hirasawa, University of Tsukuba, Tsukuba, Japan

- 0820 *A Slotline Coupled Hemispherical Dielectric Resonator Antenna*
K. M. Luk, City Polytechnic of Hong Kong, Hong Kong
K. W. Leung and K. Y. A. Lai, The Chinese University of Hong Kong, Hong Kong
- 0840 *Flat Topped Beam of Slotted Array Waveguide Antenna by Flange Technique*
P. V. Hunagund, Gulbarga University, Gulbarga, India
K. G. Nair, Cochin University of Science and Technology, Cochin, India
- 0900 *Effect of Metallic Conducting Grills on V-Slot Waveguide Antenna*
P. V. Hunagund, Gulbarga University, Gulbarga, India
K. G. Nair, Cochin University of Science and Technology, Cochin, India
- 0920 *Shaped-Beam Waveguide-Fed Antennas: Early UK Work*
A. L. Cullen, University College, London, UK
- 0940 *Multi-Band Reflector Antenna With Double-Ring Element Frequency Selective Subreflector*
T.-K. Wu, JPL, California Institute of Technology, Pasadena, CA, USA
S. W. Lee, University of Illinois, Urbana, IL, USA
- 1000 **Coffee Break**
- 1020 *Normal Mode Cross-Helix for Circular Polarization*
S. H. Zainud-Deen, H. A. Sharshar, and K. H. Awadalla, Menoufia University, Menouf, Egypt
- 1040 *A Conformal V-Conical Antenna With Elliptic Cross Section*
N. Yuan, C. Ruan, and W. Li, University of Electric Science and Technology of China, ChenDu, PRC
- 1100 *Monolithic, Photoconductively Triggered Ultra-Wideband Radiator With Charge Reservoir*
A. Kim, L. Di Domenico, R. Youmans, and M. Weiner, U.S. Army Research Laboratory, Fort Monmouth, NJ, USA
L. Jasper and G. Tran, U. S. Army Research Laboratory, Adelphi, MD, USA
K. Busby, B-K Dynamics, Inc., Rockville, MD, USA
- 1120 *A Lens-Corrected Dielectric Core Plural Hybrid Mode Multiflare Conical Horn: A Compact High Gain Antenna for Satellite Communications*
R. A. Nair, Mankato State University, Mankato, MN, USA

SESSION 5A3

Friday, July 16, AM 0800-1200, Steele Laboratory, Room 102

Organizer: C. E. Baum

TRANSIENT RADAR

Co-Chairpersons: C. E. Baum, Phillips Laboratory, Albuquerque, NM, USA, and
M. A. Morgan, Naval Postgraduate School, Monterey, CA, USA

- 0800 *Probability Theory Applied to the Problem of Radar Target Discrimination*
C. R. Smith, Research Development and Engineering Center, U.S. Army Missile
Command, Redstone Arsenal, AL, USA
L. S. Riggs, Auburn University, Auburn, AL, USA
- 0820 *Wavelet for Radar Target Identification*
H. N. Kritikos, University of Pennsylvania, Philadelphia, PA, USA
- 0840 *Model-Based Methods in Ultra-Wideband Target Identifications*
D. G. Dudley and P. A. Nielsen, University of Arizona, Tucson, AZ, USA
- 0900 *Ultra-Wideband Scale Model Impulse Radar*
M. A. Morgan, Naval Postgraduate School, Monterey, CA, USA
- 0920 *Phase Space Parametrization of Short-Pulse Time Domain Scattering*
L. B. Felsen, Polytechnic University, Brooklyn, NY, USA
- 0940 *On the Low-Frequency Dipole Moments of Impulse Radiating Antennas (IRAs)*
D. V. Giri, Pro-Tech, Lafayette, CA, USA
F. M. Tesche, Electromagnetics Consultant, Dallas, TX, USA
- 1000 **Coffee Break**
- 1020 *On the Performance Evaluation of Impulse Radiating Antennas*
Y. Rahmat-Samii, University of California, Los Angeles, CA, USA
- 1040 *Uniform Isotropic-Dielectric Equal-Time Lenses for Matching Combinations of Plane and
Spherical Waves*
C. E. Baum and J. J. Sadler, Phillips Laboratory, Albuquerque, NM, USA
A. P. Stone, Phillips Laboratory and University of New Mexico, Albuquerque, NM,
USA
- 1100 *Experimental Studies of Time Domain Antennas*
C. J. Buchenauer, Phillips Laboratory/WSR, Kirtland AFB, NM, USA
- 1120 *Extending the Definitions of Antenna Gain and Radiation Pattern into the Time Domain*
E. G. Farr, Farr Research, Albuquerque, NM, USA
C. E. Baum, Phillips Laboratory, Albuquerque, NM, USA
- 1140 *Transient Radar Measurements and Analysis at NRaD*
R. J. Dinger, M. A. Pollock, T. E. Tice, Radar Branch, Naval Command, Control and
Ocean Surveillance Center, NRaD, San Diego, CA, USA
M. J. Shensa, Systems Design Branch, Naval Command, Control and Ocean
Surveillance Center, NRaD, San Diego, CA, USA
R. H. Ott, General Research Corp., Albuquerque, NM, USA
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SESSION 5A4

Friday, July 16, AM 0820-1140, Downs Laboratory, Room 107

Organizers: A. Ishimaru, L. Tsang, and K. O'Neill

VOLUME SCATTERING

Co-Chairpersons: K. O'Neill, USA CRREL, Hanover, NH, USA, and
M. Tateiba, Kyushu University, Fukuoka, Japan

- 0820 *Second Order Distorted Born Approximation for Backscattering From a Layer of Discrete Random Medium*
R. H. Lang, George Washington University, Washington, DC, USA
S. S. Saatchi, JPL, California Institute of Technology, Pasadena, CA, USA
- 0840 *Symmetry in Polarimetric Remote Sensing*
S. V. Nghiem, S. H. Yueh, and R. Kwok, JPL, California Institute of Technology, Pasadena, CA, USA
- 0900 *Relationship of Attenuation in a Vegetation Canopy to Physical Parameters of the Canopy*
M. A. Karam and D. M. Le Vine, NASA/Goddard Space Flight Center, Greenbelt, MD, USA
- 0920 *Theory of Microwave Scattering From Vegetation Based on the Collective Scattering Effects of Discrete Scatterers*
K. Pak, Z. Chen, and L. Tsang, University of Washington, Seattle, WA, USA
J. A. Kong and C. Hsu, MIT, Cambridge, MA, USA
- 0940 *Analysis of Distortion of Pulse Waves Propagated Through Turbulent Media in Chirp Radar Systems*
K. Fujisaki and M. Tateiba, Kyushu University, Fukuoka, Japan
- 1000 **Coffee Break**
- 1020 *Space Group Resonance in Electromagnetic Wave Multiple Scattering*
Yu. N. Barabanenkov, Institute of Radioengineering and Electronics, Russian Academy of Sciences, Biomedical Electronics Centre, Moscow, Russia
V. V. Shlyapin, Moscow Institute of Physics and Technology, Moscow, Russia
- 1040 *Cross-Invariant Generalization of Ambarzumian-Chandrasekhar Radiative-Transfer Theory*
Yu. N. Barabanenkov and D. I. Kryukov, Institute of Radioengineering and Electronics, Russian Academy of Sciences, Biomedical Electronics Centre, Moscow, Russia
- 1100 *Statistics of Wave Reflection From a One-Dimensional Slab of Discrete Correlated Scatterers*
Yu. N. Barabanenkov, Institute of Radioengineering and Electronics, Russian Academy of Sciences, Biomedical Electronics Centre, Moscow, Russia
M. I. Kalinin, All-Union Research Centre for Surface and Vacuum Investigation, Moscow, Russia
- 1120 *Diffusion Asymptotics of the Bethe-Salpeter Equation for Vector Electromagnetic Waves in Random Media: Exact Formula for the Diffusion Constant*
Yu. N. Barabanenkov, Institute of Radioengineering and Electronics, Russian Academy of Sciences, Biomedical Electronics Centre, Moscow, Russia
V. D. Ozrin, Nuclear Safety Institute, Russian Academy of Sciences, Moscow, Russia

SESSION 5A5

Friday, July 16, AM 0840-1120, Downs Laboratory, Room 103

Organizer: J. Zapata

PASSIVE COMPONENTS I

Co-Chairpersons: J. Zapata, Ciudad Universitaria, Madrid, Spain, and
T. Itoh, University of California, Los Angeles, CA, USA

- 0840 *Field Theory Design of Rectangular and Circular Aperture Coupled Broad—and Narrow—Wall Couplers*
T. Sieverding and F. Arndt, University of Bremen, Bremen, Germany
- 0900 *A 3-D Mode-Matching Technique for the Efficient CAD of Passive Components*
F. Alessandri, M. Mongiardo, and R. Sorrentino, Università di Perugia, Perugia, Italy
- 0920 *Rigorous Multimode Network/Numerical Representation of Capacitive Step*
M. Guglielmi and G. Gheri, ESA/ESTEC, Noordwijk, The Netherlands
- 0940 *Computer-Aided Synthesis of Iris-Coupled Rectangular Waveguide Filters*
J. Bornemann, University of Victoria, Victoria, B.C., Canada
J. Uher, Spar Aerospace Ltd, Ste-Anne-de-Bellevue, Québec, Canada
- 1000 **Coffee Break**
- 1020 *Variable Waveguide Power Dividers for High Power Applications*
U. Rosenberg, ANT Nachrichtentechnik GmbH, Backnang, Germany
J. Bornemann, University of Victoria, Victoria, B.C., Canada
- 1040 *Microwave Devices and Circuits Design Based on Finite Element Method*
V. Madrangeas, S. Verdeyme, M. Aubourg, and P. Guillon, IRCOM, URA CNRS, Limoges, France
- 1100 *Design of Coupling and Tuning Devices for Dual-Mode Microwave Filters in Circular Waveguides*
J. García, J. R. Montejo, and J. Zapata, E.T.S.I.T. Universidad Politécnica de Madrid, Ciudad Universitaria, Madrid, Spain
J. L. Cáceres, M. C. Amat, and R. Perez-Leal, Alcatel Espacio S. A., Madrid, Spain
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SESSION 5A6

Friday, July 16, AM 0840-1120, Downs Laboratory, Room 11

ELECTROMAGNETICS IN BIOLOGY AND MEDICINE

Co-Chairpersons: I. Chatterjee, University of Nevada, Reno, NV, USA, and
C. K. Chou, City of Hope National Medical Center, Duarte, CA, USA

- 0840 *Numerical Modeling for an Electric-Field Hyperthermia Applicator*
T.-K. Wu, JPL, California Institute of Technology, Pasadena, CA, USA
C. K. Chou, K. W. Chan, and J. McDougall, City of Hope National Medical Center,
Duarte, CA, USA
- 0900 *Foundations of the Wave Permittivity Diversity Imaging*
G. C. Giakos, University of Tennessee, Memphis, TN, USA
- 0920 *FDTD Calculations for an Anatomically Realistic Head*
P. J. Dimbylow, National Radiological Protection Board, Chilton, Didcot, Oxon, UK
- 0940 *The Hertz Vector and Current Distribution of Microstrip Spiral Antenna in Biological Stratified Media*
X. Xun-xian and G. Li, Huazhong University of Science and Technology, Hubei, PRC
- 1000 **Coffee Break**
- 1020 *Compression Techniques for Wavelet-Transformed Images*
A. L. DeCegama, Lockheed Sanders, Nashua, NH, USA
- 1040 *Wavelet-Based Compression of Audio Signals*
A. L. DeCegama, Lockheed Sanders, Nashua, NH, USA
- 1100 *Analytical Continuation of the Spectrum in a Broadband Image-Restoration System With Noise*
V. Ye. Morozov, Academy of Sciences, Institute of Radiophysics and Electronics,
Kharkov, Ukraine
A. V. Totsky, Affiliation?
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SESSION 5A7

Friday, July 16, AM 0820-1200, Lauritsen Laboratory, Room 269

Organizers: R. A. York and R. C. Compton

QUASI-OPTICAL ELECTRONICS

Co-Chairpersons: R. A. York, University of California, Santa Barbara, CA, USA, and
R. C. Compton, Cornell University, Ithaca, NY, USA

- 0820 *A 100-Element HBT Grid Amplifier*
D. B. Rutledge, M. Kim, J. B. Hacker, M. P. DeLisio, J.-C. Chiao, and
S.-J. Li, California Institute of Technology, Pasadena, CA, USA
E. A. Sovero, Rockwell International Corporation, Thousand Oaks, CA, USA
D. R. Gagnon, Naval Weapons Center, China Lake, CA, USA
J. J. Rosenberg, Harvey Mudd College, Claremont, CA, USA
- 0840 *A Uniformity/Yield Study for Monolithic GaAs Arrays for Quasi-Optical Applications*
K. Y. Hur, M. J. Vaughan, and R. C. Compton, Cornell University, Ithaca, NY, USA
- 0900 *Quasi-Optical Linear Arrays*
J. Lin, S. Kawasaki, and T. Itoh, University of California, Los Angeles, CA, USA
- 0920 *Frequency Conversion and Parametric Oscillation in Linear Active Arrays*
R. J. Ram and R. A. York, University of California, Santa Barbara, CA, USA
- 0940 *High-Speed High-Performance Optical Phase Modulators*
V. M. Hietala, S. H. Kravitz, G. A. Vawter, M. G. Armendariz, and
R. F. Carson, Sandia National Laboratories, Albuquerque, NM, USA
- 1000 **Coffee Break**
- 1020 *Liquid Crystal Phase Modulators for Imaging and Beam Control*
J. Eschler, S. Dickmann, O. Cossalter, and D. A. Mlynski, Institut für Theoretische
Elektrotechnik und Meßtechnik Universität Karlsruhe, Karlsruhe, Germany
- 1040 *Applications of Matrix Method to the Analysis of Asymmetric Coupled Nonlinear Optical Waveguides*
H. Chang and V. K. Tripathi, Oregon State University, Corvallis, OR, USA
- 1100 *Numerical Analysis of Waveguide Bends and Crossings in Integrated Optics*
M. Büker, U. Hempelmann, G. Mrozynski, and G. Neumann, Fachgebiet Theoretische
Elektrotechnik, Universität-GH, Paderborn, Germany
- 1120 *Analysis of Optical Rib Waveguides by a Scalar Interior-Exterior Formulation*
R. Faraji-Dana, Y. L. Chow, and W. Huang, University of Waterloo, Waterloo, Ontario,
Canada
- 1140 *All-Fiber Optical Circuitry Employing Hybrid State of Polarization*
H. Hung-chia, Shanghai University of Science and Technology, Shanghai, PRC
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SESSION 5A8

Friday, July 16, AM 0820-1120, Keck Laboratories, Room 42

INTERFEROMETRY I

Co-Chairpersons: H. A. Zebker, JPL, California Institute of Technology, Pasadena, CA, USA, and
A. K. Fung, University of Texas, Arlington, TX, USA

- 0820 *SAR Interferometry Experiments with ERS-1: Elevation Errors in the Bonn Experiments*
C. Prati, F. Rocca, and A. Monti Guarnieri, Dipartimento di Elettronica Politecnico di
Milano, Milano, Italia
- 0840 *Analysis of the TOPSAR Simulation Campaign in Southern Italy*
A. Moccia, S. Vetrella, S. Ponte, and G. Alberti, Istituto di Gasdinamica, Facolto di
Ingegneria, Universita degli Studi di Napoli, Napoli, Italia
- 0900 *Precision Positioning of Interferometric Tracks*
D. Massonnet, C. Carmona, Th. Rabaute, and M. Rossi, CNES Direction Applications,
Sous-Direction de Systèmes d'Observation de la Terre et de Reconnaissance, Toulouse,
France
- 0920 *Accuracy of Interferometric Radar Topographic Mapping*
H. Zebker and S. Madsen, JPL, California Institute of Technology, Pasadena, CA, USA
- 0940 *Observations of Glaciers with ERS-1 Interferometry*
R. Goldstein, JPL, California Institute of Technology, Pasadena, CA, USA
- 1000 **Coffee Break**
- 1020 *Processing the CCRS C-band Interferometric SAR Data and Evaluation of the Resulting
Topographic Information*
A. L. Gray, K. E. Mattar, and P. J. Farris-Manning, Canada Centre for Remote Sensing,
Ottawa, Ontario, Canada
- 1040 *INSAR Measurements of Surface Currents in the 1989 Loch Linnhe Experiment*
D. R. Thompson and J. R. Jensen, APL, Johns Hopkins University, Laurel, MD, USA
- 1100 *Repeat Track SAR Interferometry Over Forested Terrain*
L. M. H. Ulander, J. O. Hagberg, and J. Askne, Chalmers University of Technology,
Göteborg, Sweden
-

SESSION 5A9

Friday, July 16, AM 0800-1220, Beckman Laboratories, Room 24

Organizer: T. Le Toan

RADAR REMOTE SENSING OF FORESTS

Co-Chairpersons: T. Le Toan and A. Beaudoin, CESR, CNRS, Université Paul Sabatier, Toulouse, France

- 0800 *Application of Radiative Transfer Model for Remote Sensing of Forest*
C. C. Hsu, R. T. Shin, and J. A. Kong, MIT, Cambridge, MA, USA
A. Beaudoin and T. Le Toan, Centre d'Etude Spatiale des Rayonnements, CNRS,
Université Paul Sabatier, Toulouse, France
- 0820 *A Radar Backscatter Model for Discrimination of the State of a Forest Canopy*
H.-S. Tan, Nanyang Technological University, Singapore
H.-T. Chuah, University of Malaya, Kuala Lumpur, Malaysia
- 0840 *Mapping of Taiga Forest Units Using AIRSAR Data and/or Optical Data, and Retrieval of Forest Parameters*
E. Rignot and J. Way, JPL, California Institute of Technology, Pasadena, CA, USA
C. Williams and L. Viereck, Institute of Northern Forestry, U.S. Forest Service, Fairbanks, AK, USA
- 0900 *Relating L- and C-Band Backscatter to the Biomass of Eucalyptus Plantations*
A. Beaudoin and T. Le Toan, CESR, CNRS, Toulouse, France
O. Hamel, CIRAD, Pointe-Noire, Congo
- 0920 *Trees Project: Detecting Changes in a Tropical Forest Ecosystem Using Multi-Temporal ERS-1 SAR Data*
H. De Groof, A. Sokeland, J. A. Conway, M. Leysen, E. Nezry, and A. J. Sieber, CEC Joint Research Centre, Ispra, Italy
A. Sowter, VEGA Group PLC, Harpenden, UK
- 0940 *Assessing the Effect of Scattering Mechanisms on Polarimetric Features of Forests and Agricultural Crops*
P. De Matthaeis, P. Ferrazzoli, and D. Solimini, Università Tor Vergata, Rome, Italy
- 1000 **Coffee Break**
- 1020 *Analysis of JERS-1 SAR Imagery*
Y. Hara and M. Ono, Kamakura Works, Mitsubishi Electric Corporation, Locale?, Japan
S. Fujimura, University of Tokyo, Tokyo, Japan
- 1040 *Modeling Microwave Interaction With Vegetation: The Case of Forested Areas*
P. Ferrazzoli and L. Guerriero, Università Tor Vergata, Rome, Italy
- 1100 *A Clump Model for Vegetation*
N. Chauhan, NASA/Goddard Space Flight Center, Greenbelt, MD, USA
R. Lang, George Washington University, Washington, DC, USA
- 1120 *Stand Discrimination in a Western Coniferous Forest Using Multifrequency Polarimetric SAR Data*
J. Saleta, F. W. Davis, and J. L. Day, University of California, Santa Barbara, CA, USA
- 1140 *The Effect of Natural Variability on Mutual Interaction in Microwave Scattering From Canopy Elements*
A. J. Sieber, P. Nardone, and G. Nesti, Commission of the European Communities, Institute of Remote Sensing Applications, Joint Research Centre, Ispra, Italy
- 1200 *Study of FFT Windows for Radar Imaging*
P. S. P. Wei, Boeing Defense and Space Group, Seattle, WA, USA
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SESSION 5P1

Friday, July 16, PM 1320-1700, Beckman Institute Auditorium
Organizer: K. Sarabandi

RADAR POLARIMETRY: GIGAHERTZ WAVE SCATTERING

Co-Chairpersons: K. Sarabandi, University of Michigan, Ann Arbor, MI, USA, and
C. Mätzler, University of Bern, Switzerland

- 1320 *Results From Coherent Scattering Experiments at S, C, and Ka-Bands*
C. Mätzler, M. Knuchel, T. Strozzi, and T. Weise, University of Bern, Switzerland
- 1340 *Scattering Model for Forest With Slanted Terrain*
S. Tjuatja, A. K. Fung, and F. Amar, University of Texas, Arlington, TX, USA
A. Sieber and G. de Grandi, Institute for Remote Sensing Applications, Ispra, Italy
- 1400 *Monte-Carlo Simulation of Electromagnetic Scattering From an Heterogeneous Two-Component Medium*
P. F. Polatin, K. Sarabandi, and F. T. Ulaby, University of Michigan, Ann Arbor, MI, USA
- 1420 *Application of the Target Decomposition Theorem to a Polarimetric Random Media Model*
S. S. Saatchi and J. J. van Zyl, JPL, California Institute of Technology, Pasadena, CA, USA
- 1440 *The Velocity of Electromagnetic Waves in a Dense Strongly Scattering Medium*
Y. Kuga, D. J. Rice, A. Ishimaru, University of Washington, Seattle, WA, USA
- 1500 **Coffee Break**
- 1520 *A Theoretical and Numerical Study of Polarimetric Scattering and Emission From Random Rough Surfaces With Anisotropic Directional Spectrum*
S. H. Yueh and R. Kwok, JPL, California Institute of Technology, Pasadena, CA, USA
- 1540 *Enhancement Effects in Vegetation Scattering: Antenna Beamwidth Considerations*
N. Khadr and R. H. Lang, George Washington University, Washington, DC, USA
- 1600 *Application of Neural Network to Remote Sensing of Soil Moisture Using Theoretical Polarimetric Backscattering Coefficients*
L. Wang, R. T. Shin, and J. A. Kong, MIT, Cambridge, MA, USA
S. H. Yueh, JPL, California Institute of Technology, Pasadena, CA, USA
- 1620 *The Brewster Angle Effect in SAR Polarimetry*
B. Chapman, JPL, California Institute of Technology, Pasadena, CA, USA
- 1640 *E and H-Polarized Scattering From Single and Multiple Elongated Cavities in a Perfectly Conducting Surface*
G. A. Schiavone and K. D. Paulsen, Dartmouth College, Hanover, NH, USA
K. O'Neill, Cold Regions Research and Engineering Laboratory, Hanover, NH, USA
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SESSION 5P2

Friday, July 16, PM 1320-1700, Baxter Lecture Hall

Organizers: C. Martín-Pascual and R. Klemm

MOBILE ANTENNAS AND INTELLIGENT ANTENNAS FOR EARTH OBSERVATION

Co-Chairpersons: C. Martín-Pascual, TeDeCe, Madrid, Spain, and
R. Klemm, FGAN-FFM, Wachtberg-Werthhoven, Germany

- 1320 *Mobile Antenna Development at JPL*
J. Huang, V. Jamnejad, A. Densmore, A. N. Tulintseff, R. Thomas, and
K. Woo, JPL, California Institute of Technology, Pasadena, CA, USA
- 1340 *Antenna Developments for Mobile and Personal Communications at TeDeCe*
C. Martín-Pascual, TeDeCe, Madrid, Spain
- 1400 *A Low Cost Circularly Polarised Antenna With Toroidal Pattern*
A. G. Roederer, A. Jongejans, ESA/ESTEC, City?, The Netherlands
P. L. García Mueller, INTA, City ?, Spain
J. Barbero, TeDeCe, Madrid, Spain
- 1420 *One Turn Antenna for L-Band Land Mobile Communications*
A. Hujanen and S. Tallqvist, Technical Research Centre of Finland, Espoo, Finland
- 1440 *Printed Rotary Joint for Mobile Applications*
C. Martín and Q. García, TeDeCe, Madrid, Spain
- 1500 **Coffee Break**
- 1520 *Mobile Terminal Antennas for Helicopters*
T. K. Wu, K. Farazian, N. Golshan, D. Divsalar, S. Hinedi, and K. Woo, JPL, California
Institute of Technology, Pasadena, CA, USA
- 1540 *Autofocusing Techniques for Imaging Moving Targets by SAR Based on Multilinear Time-
Frequency Representations*
S. Barbarossa, Università di Roma "La Sapienza," Rome, Italy
- 1600 *Self Focussing of a Synthetic Aperture Radar Based on Multichannel Array Data*
J. Ender, FGAN-FFM, Wachtberg-Werthhoven, Germany
- 1620 *The Effects of SAR Autofocus Techniques on Image Quality*
C. J. Oliver, Defense Research Agency, Malvern, UK
- 1640 *Special Problems in Airborne Adaptive MTI Radar*
R. Klemm, FGAN-FFM, Wachtberg-Werthhoven, Germany
-

SESSION 5P3

Friday, July 16, PM 1340-1600, Steele Laboratory, Room 102

Organizer: J. C. Leader

**COMPUTATIONAL ELECTROMAGNETIC METHODS FOR
ELECTRICALLY LARGE PROBLEMS**

Co-Chairpersons: J. C. Leader and L. N. Medgyesi-Mitschang, McDonnell Douglas, Saint Louis, MO, USA

- 1340 *Parallel Computations in Electromagnetics*
A. King, Sandia National Laboratories, Albuquerque, NM, USA
L. N. Medgyesi-Mitschang and J. M. Putnam, McDonnell Douglas Aerospace - East, St. Louis, MO, USA
- 1400 *Method of Moments Analysis on a Massively Parallel Supercomputer*
V. P. Cable, Lockheed Advanced Development Co., Sunland, CA, USA
- 1420 *Propagation and Scattering in Structures Incorporating Polarizable Materials*
W. F. Hall, V. Shankar, A. H. Mohammadian, and M. K. Bleszynski, Rockwell International Science Center, Thousand Oaks, CA, USA
E. H. Bleszynski, North American Aircraft, Rockwell International, Los Angeles, CA, USA
- 1440 *FD-TD Modeling of Electrically Large 3-D Structures With the Cray EMDS Software Package*
D. S. Katz, M. Piket-May, and A. Taflov, Northwestern University, Evanston, IL, USA
- 1500 **Coffee Break**
- 1520 *Parallel Computers and Electromagnetically Large 3-D Time Domain Problems*
N. K. Madsen, Lawrence Livermore National Laboratory, Livermore, CA, USA
- 1540 *NL-FDTD Modeling of Optical Pulse Propagation in Nonlinear Waveguides*
R. W. Ziolkowski and J. B. Judkins, University of Arizona, Tucson, AZ, USA
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SESSION 5P3

Friday, July 16, PM 1340-1600, Steele Laboratory, Room 102

Organizer: J. C. Leader

**COMPUTATIONAL ELECTROMAGNETIC METHODS FOR
ELECTRICALLY LARGE PROBLEMS**

Co-Chairpersons: J. C. Leader and L. N. Medgyesi-Mitschang, McDonnell Douglas, Saint Louis, MO, USA

- 1340 *Parallel Computations in Electromagnetics*
A. King, Sandia National Laboratories, Albuquerque, NM, USA
L. N. Medgyesi-Mitschang and J. M. Putnam, McDonnell Douglas Aerospace - East, St. Louis, MO, USA
- 1400 *Method of Moments Analysis on a Massively Parallel Supercomputer*
V. P. Cable, Lockheed Advanced Development Co., Sunland, CA, USA
- 1420 *Propagation and Scattering in Structures Incorporating Polarizable Materials*
W. F. Hall, V. Shankar, A. H. Mohammadian, and M. K. Bleszynski, Rockwell International Science Center, Thousand Oaks, CA, USA
E. H. Bleszynski, North American Aircraft, Rockwell International, Los Angeles, CA, USA
- 1440 *FD-TD Modeling of Electrically Large 3-D Structures With the Cray EMDS Software Package*
D. S. Katz, M. Picket-May, and A. Taflov, Northwestern University, Evanston, IL, USA
- 1500 **Coffee Break**
- 1520 *Parallel Computers and Electromagnetically Large 3-D Time Domain Problems*
N. K. Madsen, Lawrence Livermore National Laboratory, Livermore, CA, USA
- 1540 *FDTD Modeling of Optical Pulse Propagation in Nonlinear Waveguides*
R. W. Ziolkowski and J. B. Judkins, University of Arizona, Tucson, AZ, USA
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SESSION 5P7

Friday, July 16, PM 1320-1640, Lauritsen Laboratory, Room 269

Organizer: N. M. Lawandy

EXPERIMENTAL AND THEORETICAL ADVANCES IN PHOTONIC BAND STRUCTURE

Co-Chairpersons: N. M. Lawandy, Brown University, Providence, RI, USA, and
J.-F. Eloy, French Atomic Energy Commission, Le Barp, France

- 1320 *Photonic Bandgaps and Semiconductor Quantum Electronics*
E. Yablonovitch, University of California, Los Angeles, CA, USA
- 1340 *Lasing in Semiconductor Photonic Lattices*
P. L. Gourley, M. E. Warren, J. R. Wendt, G. A. Vawter, T. M. Brennan, and
B. E. Hammons, Sandia National Laboratories, Albuquerque, NM, USA
- 1400 *Photonic Band Gap Structures for Microwave Applications*
S. Schultz, University of California, La Jolla, CA, USA
- 1420 *Photonic Band Structures for Optoelectronic Applications*
J. W. Haus, Rensselaer Polytechnic Institute, Troy, NY, USA
- 1440 *Low Loss Microwave Cavities Using Resonant Dielectric End Plates*
C. J. Maggiore, A. M. Clogston, G. Spalek, W. Sailor, and F. M. Mueller, Los Alamos
National Laboratory, Los Alamos, NM, USA
- 1500 **Coffee Break**
- 1520 *Photonic Band Structures of Periodic Structures With Metallic Components*
A. A. Maradudin, University of California, Irvine, CA, USA
A. R. McGurn, Western Michigan University, Kalamazoo, MI, USA
- 1540 *Vector KKR Method for Calculating Photonic Band Structure*
J. C. Ryan, C. L. Adler, and W. S. Rabinovich, Naval Research Laboratory, Washington,
DC, USA
- 1600 *Exploring New Structures and New Algorithms for Photonic Band Gaps*
C. T. Chan, K. M. Ho, C. M. Soukoulis, S. Datta, and C. L. Yu, Ames Laboratory,
USDOE, Ames, IA, USA
- 1620 *Accurate Theoretical Analysis of Photonic Band-Gap Materials*
R. D. Meade, A. M. Rappe, O. L. Alerhand, K. D. Brommer, and
J. D. Joannopoulos, MIT, Cambridge, MA, USA

SESSION 5P8

Friday, July 16, PM 1340-1600, Keck Laboratories, Room 42

INTERFEROMETRY II

Co-Chairpersons: H. A. Zebker, JPL, California Institute of Technology, Pasadena, CA, USA,
and E. R. Westwater, NOAA, Boulder, CO, USA

- 1340 *Estimation of Ocean Wave Spectra From Interferometric SAR Signals*
D. Lyzenga and N. P. Malinas, ERIM, Ann Arbor, MI, USA
- 1400 *The Statistics of Radar Backscatter Phase*
R. Chapman and B. Gotwols, APL, Johns Hopkins University, Laurel, MD,
USA
- 1420 *The NASA TOPSAT Global Topography Mission*
J. Martin, JPL, California Institute of Technology, Pasadena, CA, USA
- 1440 *Interferometric SAR Phase Error Model*
N. P. Malinas and D. R. Lyzenga, ERIM, Ann Arbor, MI, USA
- 1500 **Coffee Break**
- 1520 *Topographic Slope From the SAR Interferometric Phase Gradient*
C. L. Werner University of Zürich, Remote Sensing Laboratories, Zürich,
Switzerland
P. A. Rosen, JPL, California Institute of Technology, Pasadena, CA, USA
- 1540 *Interferometric Detection of Freeze-Thaw Displacement of Alaskan
Permafrost Using ERS-1 Data*
C. L. Werner, University of Zürich, Remote Sensing Laboratories, Zürich,
Switzerland
A. K. Gabriel, JPL, California Institute of Technology, Pasadena, CA, USA
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SESSION 5P9

Friday, July 16, PM 1320-1640, Beckman Laboratories, Room 24

RADAR SYSTEMS AND APPLICATIONS

Co-Chairpersons: D. G. Long, Brigham Young University, Provo, UT, USA, and
H. R. Raemer, Northeastern University, Boston, MA, USA

- 1320 *Effects of Wind Shear on Aircraft: Low Level Wind Shear Alert System*
D. N. Rao, T. G. Faizuddin, K. K. Reddy, and P. Kishore, S. V. University, Tirupati,
India
- 1340 *Indian MST Radar: Wind Shear and Horizontal Wind Measurements*
D. N. Rao, P. Kishore, and T. R. V. Kumar, S. V. University, Tirupati, India
- 1400 *Verticality of the Vertical Beam of Indian MST Radar: A Preliminary Study*
D. N. Rao, P. Kishore, V. G. Viswanathan, and T. G. Faizuddin, S. V. University,
Tirupati, India
- 1420 *Coping With Instrument Landing System Degradations*
W. Van Look and G. De Vidts, University of Gent, Gent, Belgium
- 1440 *Statistical Model of FM-Broadcast Interference to the Instrument Landing System (ILS)*
Y. E. Yang, Q. Gu, and M. A. Tassoudji, Research Laboratory of Electronics, MIT,
Cambridge, MA, USA
R. J. Kelly, Allied-Signal Bendix Communications Division, Baltimore, MD, USA
G. J. Markey, Federal Aviation Administration, Washington, DC, USA
- 1500 **Coffee Break**
- 1520 *Theoretical Models for Low-Altitude Propagation Over Terrain*
G. T. Huang and R. T. Shin, Research Laboratory of Electronics, MIT, Cambridge, MA,
USA
- 1540 *UTD Propagation Model for Micro-Cellular Communications in an Urban Street Scene*
S. Y. Tan and H. S. Tan, Nanyang Technological University, Singapore
- 1600 *ASCAT: A Light-Weight Low-Cost Scatterometer*
D. G. Long, Brigham Young University, Provo, UT, USA
- 1620 *Noise and Distortion Effects in FMCW Radar*
A. Z. Tirkel and C. F. Osborne, Monash University, Caulfield East, Melbourne, Victoria,
Australia, and Scientific Technology, East Brighton, Victoria, Australia
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PIERS 1993 at a Glance,
THE SCHEDULE.....

PIERS 1993 AT A GLANCE, THE SCHEDULE*

Room	Mon 12, am	Mon 12, pm	Tues 13, am	Tues 13, pm	Wed 14, am
Beckman Institute Auditorium	1A1 Inverse Problems of Low-Frequency EM	1P1 Radar Clutter and Multipath Effects	2A1 RP: Basic Theory	2P1: RP: Vector Scattering	3A1 RP: Metrology
Baxter Lecture Hall	1A2 Antennas and Radiation	1P2 Antennas and Computations	2A2 Synthesis of Antenna Aperture Distributions	2P2 Microstrip and Printed Antennas	3A2 Microstrip Antennas and Structures
Steele Laboratory Room 102	1A3 Computational EM I	1P3 Computational EM II	2A3 Computational EM III	2P3 Recent Advances in the Computation and Diffraction of EM Waves	3A3 Generalized Multipole Techniques
Downs Laboratory Room 107	1A4 Current Topics in Scattering and Diffraction	1P4 Scattering and Diffraction of EM Waves	2A4 Scattering and Diffraction I	2P4 Scattering and Diffraction II	3A4 Surface and Volume Scattering: Rough Surface Scattering
Downs Laboratory Room 103	1A5 Field Effects of Moving Sources and Propagative Media	1P5 EM Interaction With the Atmosphere, Ionosphere, and Troposphere	2A5 Inhomogeneous Media	2P5 EM Interactions With Special Media I	3A5 EM Interactions With Special Media II
Downs Laboratory Room 11	1A6 Linear and Nonlinear Optical Properties of Surfaces	1P6 Analytical Methods	2A6 Bridges from EM Theory to Circuit Theory...	2P6 New Trends in Electromagnetic Theory	3A6 Special Session Honoring Professor Charles Papas
Lauritsen Laboratory Room 269	1A7 Remote Sensing of the Earth	1P7 Remote Sensing I	2A7 Remote Sensing II	2P7 Devices and Circuits I	3A7 Devices and Circuits II
Keck Laboratories Room 42	1A8 Near-Field Microwave Imaging: Theory and Practice	1P8 EM Inverse Scattering Methods for Geophysical Applications	2A8 EM Inverse Scattering	2P8 Wave Propagation and Planar Structures	3A8 Full-Wave Simulation of Waveguide Discontinuities
Beckman Laboratories Room 24	1A9 Remote Sensing of the Ocean	1P9 Microwave Remote Sensing of Ocean Wind	2A9 EM Subsurface Sensing I	2P9 EM Subsurface Sensing II	3A9 Sea Ice EM I

* Note: Locations are bulleted on the Campus Building Directory, p. 101 of this Program.

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3P2 EM Interference and Antennas	4A2 Antenna Arrays	4P2 Array Applications	5A2 Special Antennas and Applications	5P2 Mobile Antennas and Intelligent Antennas for Earth Observations
3P3 Efficient Methods to Solve Wave- Scattering and Propagation Problems	4A3 Advanced Computational Methods and Massive Parallel Computation	4P3 Physical Mechanism Extraction From Computational Methods	5A3 Transient Radar	5P3 Computational EM Methods for Electrically Large Problems
3P4 Dense Media and Rough Surface Scattering	4A4 Rough Surface Scattering	4P4 Diffraction	5A4 Volume Scattering	
3P5 Bianisotropic and Chiral Media	4A5 EM Propagation in Composite Materials: EM Modeling	4P5 EM Propagation in Composite Materials: Meas. Techniques	5A5 Passive Components I	5P5 Passive Components II
3P6 Medical Applications	4A6 Medical and Biological Applications of Microwaves	4P6 Biomedical Applications of Computational EM	5A6 EM in Biology and Medicine	
3P7 Microwave/ Millimeter Wave Instrumentation and Calibration	4A7 EM Compatibility in Equipment and Integrated Circuit Packaging Tech.	4P7 Microwave Applications of Ferroelectric Thin Films	5A7 Quasi-Optical Electronics	5P7 Experimental and Theoretical Advances in Photonic Band Structure
3P8 Microstrip and Coplanar Lines	4A8 Transmission Lines	4P8 Waveguides and Waveguide Components	5A8 Interferometry I	5P8 Interferometry II
3P9 Sea Ice EM II	4A9 Microwave Radiometry for Remote Sensing	4P9 Passive Microwave Remote Sensing for Spaceborne Applications	5A9 Radar Remote Sensing of Forests	5P9 Radar Systems and Applications

**California
Institute
of
Technology**

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52	Chandler Dining Hall
53	Page House (Undergraduate Residence)
54	Lloyd House (Undergraduate Residence)
55	Ruddock House (Undergraduate Residence)
56	Housing Office
57	Fleming House (Undergraduate Residence)
58	Dabney House (Undergraduate Residence)
59	Ricketts House (Undergraduate Residence)
60	Blacker House (Undergraduate Residence)
61	Athenaeum (Faculty Club)
62	Housing Annex
63	Admissions and Financial Aid
64	Auditors Office
65	Parking Structure
66*	Parking Structure/Satellite Utility Plant
67	Theatre Arts
68	Public Events Office Annex
69	Gravitational Physics Laboratory
70	"The Mechanical Universe"/"Project MATHEMATICS"
71	Public Relations
72	Noyes Laboratory (Chemical Physics)
73	Mead Laboratory (Undergraduate Chemistry)
74	Beckman Institute
75	Braun Laboratories (Cell Biology and Chemistry)
76	Beckman Laboratories (Behavioral Biology)
77	Baxter Hall (Humanities and Social Sciences)
78	Keck Laboratory (Env. Engrng. Sci. and Materials Sci.)
79	Booth Computing Center
80	Jorgensen Laboratory (Computer Science)
81	Steele Laboratory (Appl. Physics and Elect. Engrng.)
82	Transportation and Grounds Operations
83	Physical Plant Offices
84	Physical Plant Shops
85	Central Engineering Services, Security Office
86	Keck House (Graduate Residence)
87	Mosher-Jorgensen House (Graduate Residence)
88	Braun House (Graduate Residence)
89	Marks House (Graduate Residence)
90	Industrial Relations Center
91	Beckman Auditorium
92	Public Events Office
94	Steele House (Residence of Master of Student Houses)
95	Watson Laboratories (Applied Physics)
96	Environmental Quality Laboratory
97	Alumni House
100-105	Graduate Student Housing

Function Index

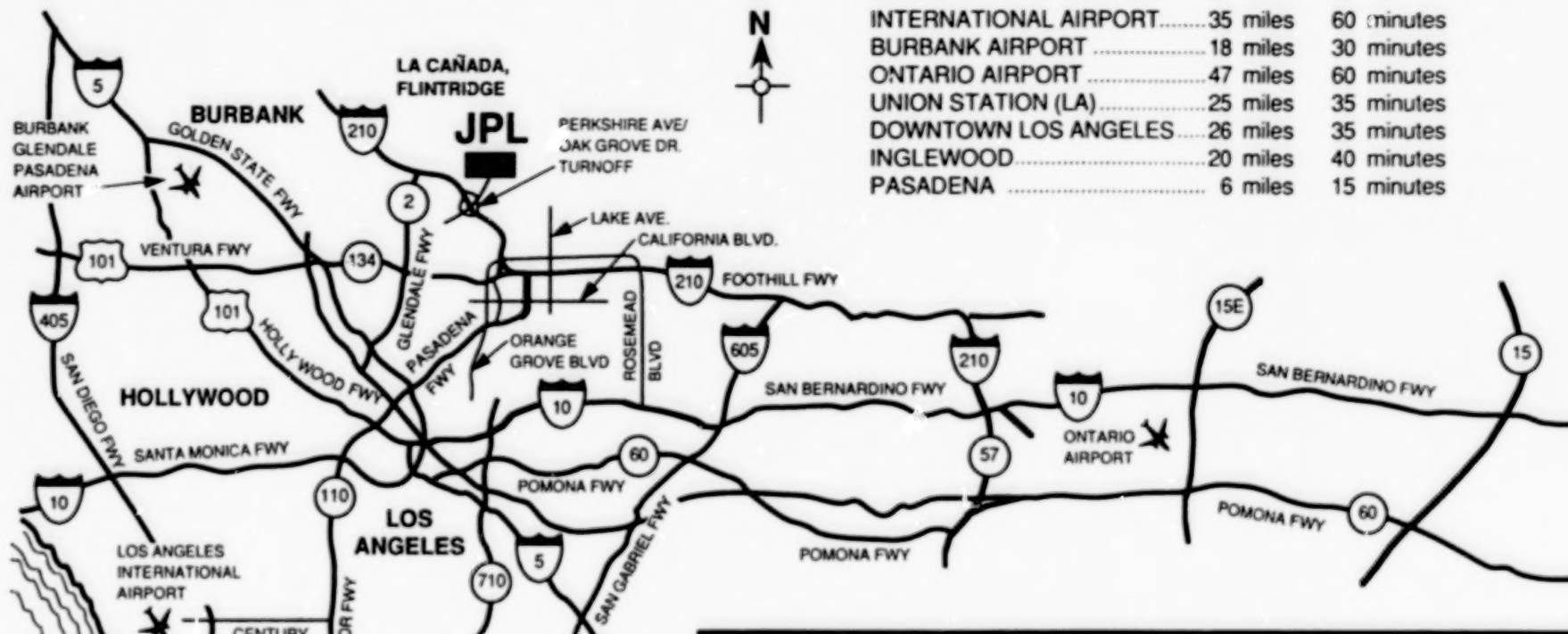
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*UNDER CONSTRUCTION 1992

Greater Los Angeles Area

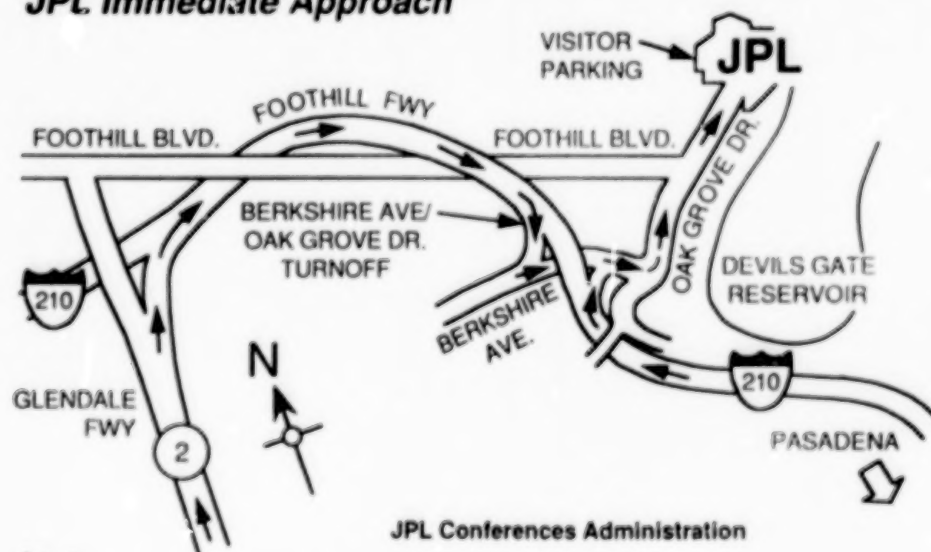
Approximate Distance and Driving Time to JPL

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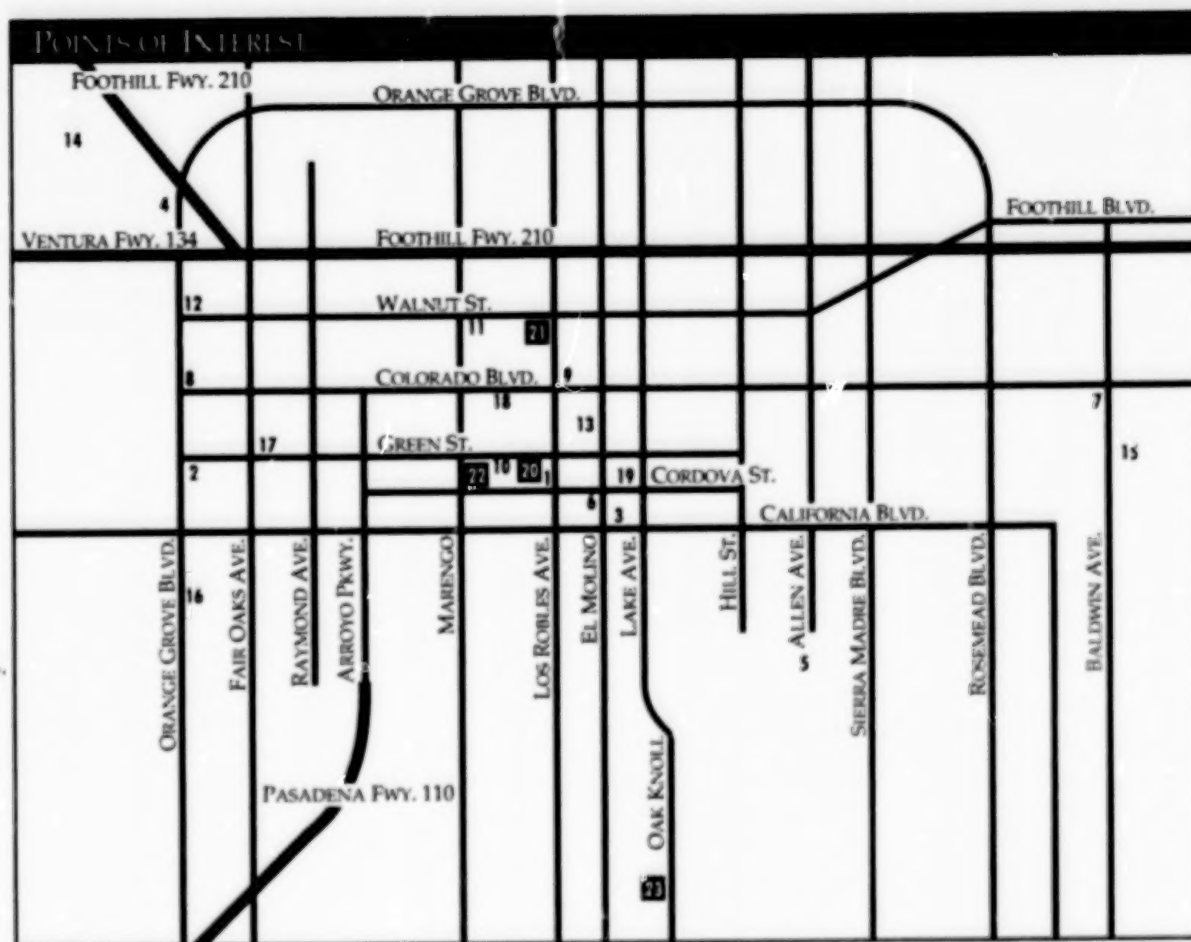
INTERNATIONAL AIRPORT.....	35 miles	60 minutes
BURBANK AIRPORT	18 miles	30 minutes
ONTARIO AIRPORT	47 miles	60 minutes
UNION STATION (LA)	25 miles	35 minutes
DOWNTOWN LOS ANGELES.....	26 miles	35 minutes
INGLEWOOD.....	20 miles	40 minutes
PASADENA	6 miles	15 minutes

JPL Immediate Approach



JPL Conferences Administration

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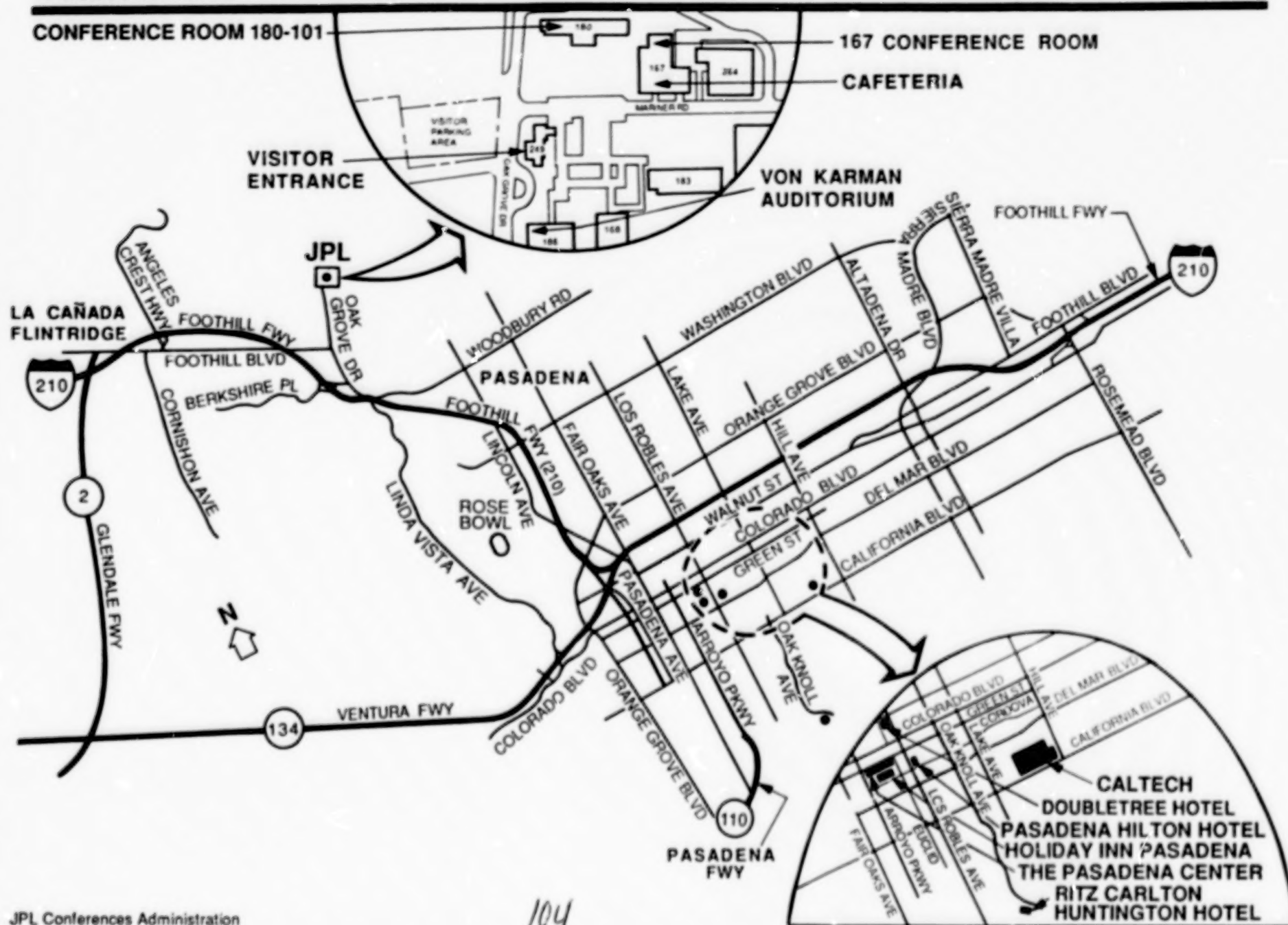
- | | | | |
|---|--------------------------------|---------------------------------------|--|
| 1 Convention and Visitors Bureau | 7 Los Angeles County Arboretum | 13 Pasadena Playhouse | 19 South Lake Avenue Shopping District |
| 2 Ambassador Auditorium | 8 Norton Simon Museum | 14 Rose Bowl | 20 Hilton Hotel |
| 3 California Institute of Technology (Symposium Site) | 9 Pacific Asia Museum | 15 Santa Anita Race Track | 21 Doubletree Hotel |
| 4 Gamble House | 10 Convention Center | 16 Tournament House & Wrigley Gardens | 22 Holiday Inn |
| 5 Huntington Library & Gardens | 11 Pasadena City Hall | 17 Old Pasadena | 23 Ritz Carlton Huntington |
| 6 Kidspace | 12 Pasadena Historical Society | 18 Plaza Pasadena | |

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PAGE

Pasadena Area

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REGISTRATION FORM
for
PIERS, JULY 12-16, 1993

Name: _____ Affiliation: _____
Address: _____ Position: _____

Telephone: _____

Fax: _____

Fees:

Registration Fee	US\$230 (US\$285 after June 15, 1993)	\$ _____
Party on July 14	Qty @US\$20 per person	\$ _____
Total amount enclosed		\$ _____

Send this form with your check, bank draft, or money order, in US currency, made payable to California Institute of Technology, to:

Georgene Peralta
Jet Propulsion Laboratory
4800 Oak Grove Drive, 180-404
Pasadena, CA 91109-8099, USA

(818) 354-9311
FAX: (818) 393-4468

Note: You are responsible for arranging your accommodations.

Please mail your Registration Form to:

Georgene Peralta
Jet Propulsion Laboratory
4800 Oak Grove Drive, 180-404
Pasadena, CA 91109-8099, USA

PIERS SURVEY

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Name: _____ Affiliation: _____

Address: _____ Position: _____

_____ Tel: _____

_____ Fax: _____

The Progress In Electromagnetics Research Symposium (PIERS) for 1993 is scheduled for July 12-16 at the Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California. The following is a questionnaire concerning future PIERS.

A. If the next PIERS is held in July 1994, would you be interested in

- ___ organizing and chairing a session
- ___ contributing a paper
- ___ attending the Symposium
- ___ not able to participate
- ___ organizing and presenting a short course or workshop

B. If the next PIERS is held in July 1995, would you be interested in

- ___ organizing and chairing a session
- ___ contributing a paper
- ___ attending the Symposium
- ___ not able to participate
- ___ organizing and presenting a short course or workshop

C. Any other comments or suggestions?

Please send this form to:

J. A. KONG

26-305, MIT

77 MASSACHUSETTS AVENUE

CAMBRIDGE, MA 02139, USA

TEL: 617-253-8535

FAX: 617-253-0987



END

10 - 18 - 93